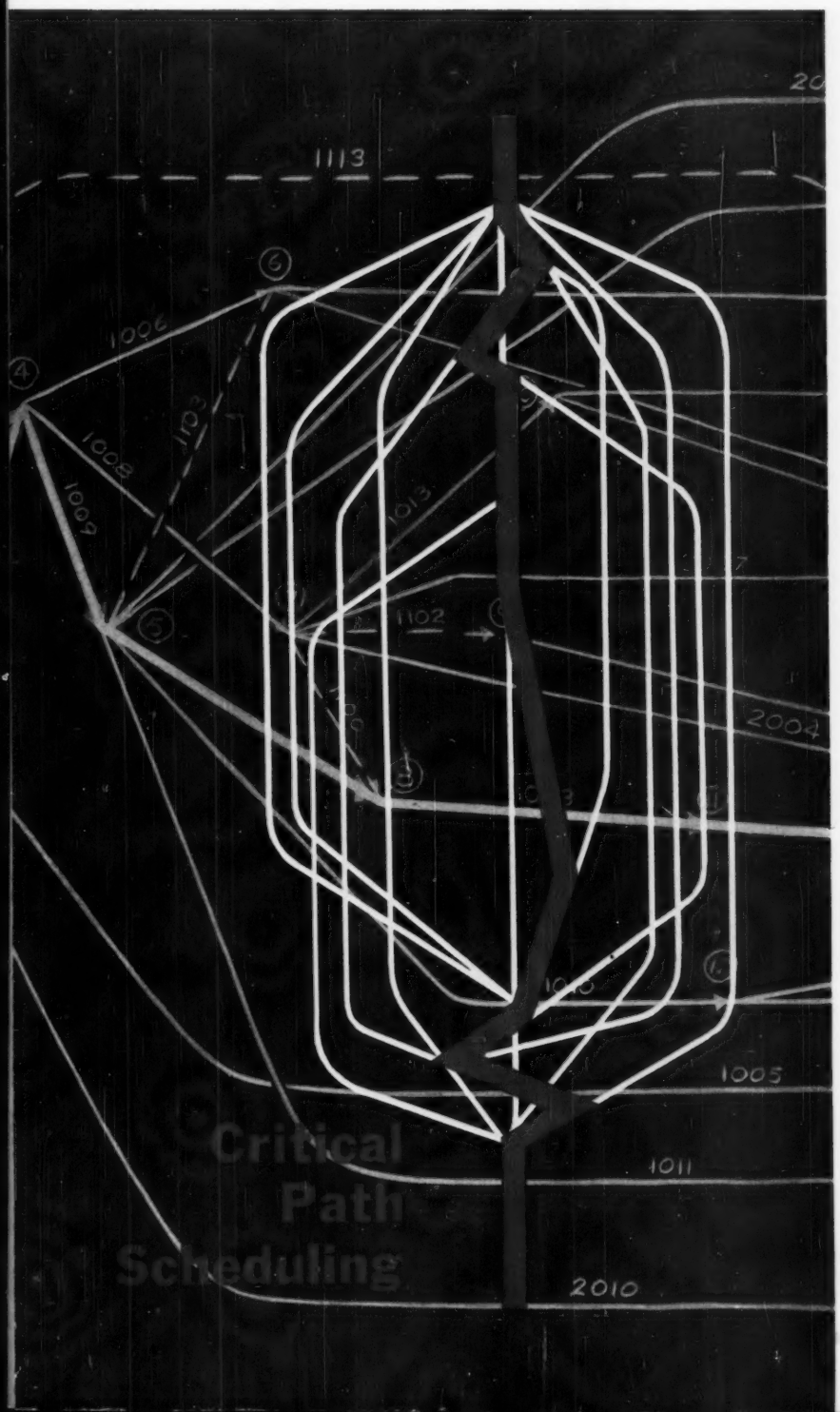
OCTOBER 15, 1960

Chemical Week

A McGRAW-HILL PUBLICATION PRICE FIFTY CENTS



New products, new distribution tactics reshape fertilizer marketing . . . . p. 21

Petrochemicals win new status in oil company reorganizations p. 47

New potash source? Utah beds refocus attention on Western U. S. . . . . p. 89

Plastics breakthrough on three fronts opens markets to new resins . p. 105

LONGEST ROUTE THROUGH THIS MAZE IS SHORTEST PATH TO NEW PLANT p. 74

STEVENS RICE GS
UNIVERSITY MICROFILMS INC
313 N 1ST ST
ANN ARBOR MICH C

INTERMEDIATES

Acetaldehyde Ammonia
Acetophenone
Acetyl Chloride
Adipoyl Chloride
Anisic Aldehyde
Anisyl Acetone
Anisyl Alcohol Tech.
Anisyl Cyanide
Azelaoyl Chloride
Benzalacetophenone
Benzhydrol
Benzhydrylamine
Benzhydryl Chloride
Benzophenone Tech.
Benzyl Alcohol Tech.
Benzyl Cyanide
Butyrophenone
Butyroyl Chloride
n-Caproic Acid
Caproyl Chloride
Capryloyl Chloride
p-Chlorbenzhydrol
p-Chlorbenzhydryl Chloride
p-Chlorbenzophenone
p-Chlorbenzyl Cyanide
Cinnamoyl Chloride
Dibenzyl Ether
Dicyclohexyl Carbinol
Dicyclohexyl Ketone
p,p'-Dimethoxybenzophenone
Diphenyl Acetone (unsym)
Diphenyl Methane
Ethyl Formate Tech.
Ethyl Phenylacetate
beta Ionone
Isobutyrophenone
Isobutyroyl Chloride
Isovaleric Acid
Isovaleroyl Chloride
Lauroyl Chloride
p-Methoxy Phenylacetic Acid
Methyl Heptenone
Methyl Phenylacetate
Myristoyl Chloride
Oleoyl Chloride
Palmitoyl Chloride
Pelargonyl Chloride
Phenylacetic Acid
Phenylacetone
Phenylacetyl Chloride
Phenyl Propyl Alcohol
Phenyl Propyl Chloride
Potassium Phenylacetate
Propionyl Chloride
Propiophenone
Sebacoyl Chloride
Sodium Phenylacetate
Stearoyl Chloride
And
Other Intermediates

Send *for new booklet which describes our operation*

THE TRUBEK LABORATORIES

East Rutherford, New Jersey

'ow to save ze money –weeth Logistics!

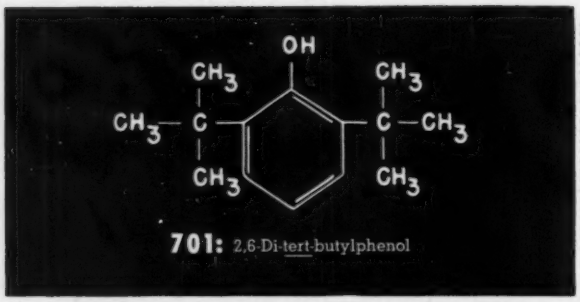
Do you find that high fixed overhead has you boxed in when it comes to cutting costs? Then have a hard look at distribution costs, roughly 10-20% of most firms' overhead. Here's where logistics—the total approach to materials movement and storage—can help create new profit dollars.

Logistics. Science of managing materials instead of just handling them. *Our* business. Supplying both the tools and know-how for efficient modern distribution. Piggyback. Containerization. Protective shipping. Terminal storage. Value analysis of distribution problems. Details? Gladly.

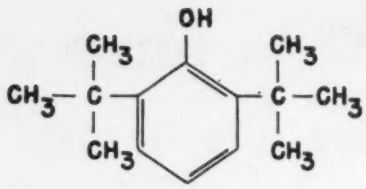
GENEVIÈVE—TV AND STAGE STAR

IF IT'S NEW IT'S NORTH AMERICAN

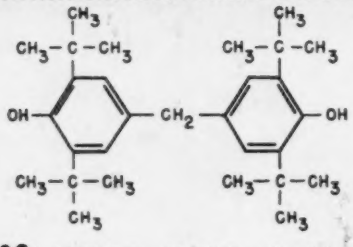
North American Car Corporation • 231 South La Salle St., Chicago 4, Illinois



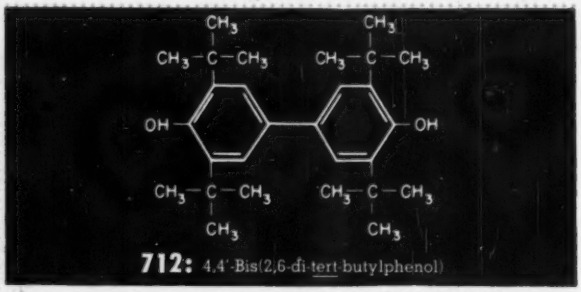
701: 2,6-Di-tert-butylphenol



733: Mixed tert-butylphenols (75% min. of 2,6-di-tert-butylphenol)



702: 4,4'-Methylenebis(2,6-di-tert-butylphenol)



712: 4,4'-Bis(2,6-di-tert-butylphenol)

which of these "ETHYL" antioxidants can help YOU

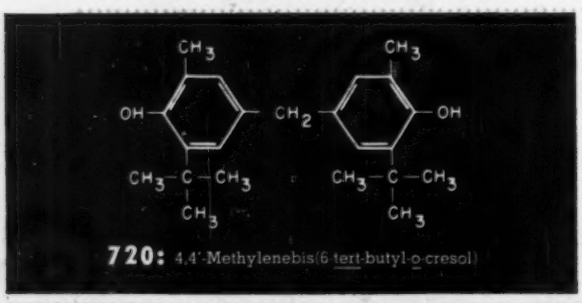
One or more of these versatile antioxidants may be helpful in your research on petroleum, rubber, plastics, or other products

701, 702, 703 and 733 are commercially available; the others can be obtained in development quantities.

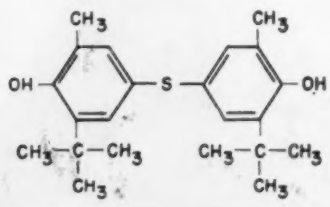
Industry is finding more and more uses for these interesting compounds. Which can help you? For more information simply call or write:

ETHYL CORPORATION, NEW YORK 17, N.Y. • TULSA • CHICAGO • LOS ANGELES

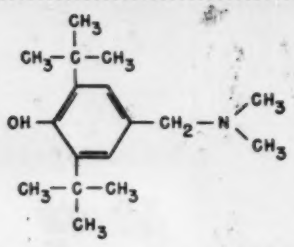
ETHYL CORPORATION OF CANADA LIMITED, TORONTO • **ETHYL USA (EXPORT)** NEW YORK 17, N.Y.



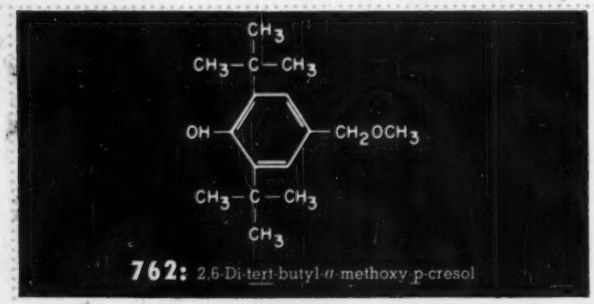
720: 4,4'-Methylenebis(6-tert-butyl-o-cresol)



736: 4,4'-Thiobis(6-tert-butyl-o-cresol)

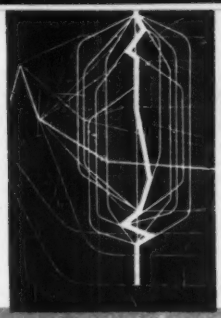


703: 2,6-Di-tert-butyl-α-dimethylamino-p-cresol



762: 2,6-Di-tert-butyl-α-methoxy-p-cresol

ON THE COVER: A design that resembles a railroad marshaling yard symbolizes the arrow diagrams used in critical path scheduling, a way to cut time and cost of capital projects.



Chemical Week

Vol. 87, No. 16 OCTOBER 15, 1960

7 **VIEWPOINT**—Now's the time to act to extend cutoff date on food additives.

9 **LETTERS**

9 **MEETINGS**

17 **BUSINESS NEWSLETTER**

21 For fatter fertilizer profits; new products, new distribution policies.

22 How GE strike will affect CPI planning on equipment, materials.

23 U.S. chemical investments abroad set records for size, growth pace.

24 Beryllium International scoops up more claims, eyes merger to get mill.

24 Government accuses Cyanamid of 23-year melamine monopoly.

25 Eastman's worst plant disaster wrecks section of Tennessee works.

27 **SALES—How sales management will tackle the tough-sell year of '61.**

28 Trading stamps, invested discounts on trial as sales boosters.

33 **SPECIALTIES—DX Sunray moves into No. 3 spot as petrowax maker.**

34 Chemical reseller, Aceto Chemical, moves deeper into chemical producing.

41 **WASHINGTON NEWSLETTER**

47 **ADMINISTRATION**—Oil company reorganizations intensify petrochemical competition.

59 **PRODUCTION—Field tests take guesswork out of valve material selection.**

60 Soon-to-be published manual will show way to improved stainless-steel welds.

71 **TECHNOLOGY NEWSLETTER**

74 **ENGINEERING**—Critical path scheduling blazes new trail in construction planning.

78 New chromium ore concentrating process may open markets for U.S. ore.

78 Applied Science Labs develops new sea-water desalting process.

82 Engelhard Industries shows off system to dispose of nuclear hydrogen waste.

89 **MARKETS**—Mounting potash demand may lure new U.S. producer into market.

99 **MARKET NEWSLETTER**

105 **RESEARCH**—Three polymers fresh from labs promise spate of new resins.

108 Novel way to find protein structure highlights recent biochemical advances.

112 Improved fuel cells make play for satellite duties.

116 **BUSINESS BENCHMARKS**

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw - Hill Publishing Co., James H. McGraw (1860-1948), founder. EXECUTIVE, EDITORIAL, CIRCULATION AND ADVERTISING OFFICES: McGraw-Hill Building, 330 West 42nd St., New York 36, N. Y. Telephone, LO 4-3000; Teletype, TWX N.Y. 1-1636; Cable, McGRAWHILL, N.Y. Place of publication: Philadelphia, Pa. Second class postage paid at Philadelphia. (See below for directions regarding subscriptions or change of address.) OFFICERS OF THE PUBLICATIONS DIVISION: Nelson L. Bond, president; Shelton Fisher, Wallace F. Traendly, senior vice-presidents; John R. Callaham, vice-president and editorial director; Joseph H. Allen, vice-president and director of advertising sales; A. R. Venezian, vice-president and circulation coordinator. OFFICERS OF THE CORPORATION: Donald C. McGraw, president; Joseph A. Gerardi, Hugh J. Kelly, Harry L. Waddell, executive vice-presidents; L. Keith Goodrich, vice-president and treasurer; John J. Cooke, secretary.

United States and United States possessions subscription rate for individuals in the field of the publication, $3 per year; single copies, 50¢. Foreign subscription rates per year: Canada, $4; other Western Hemisphere countries, $15; all others, $25, payable in advance. Printed in U.S.A. Title registered in U.S. Patent Office.

© Copyright 1960 by McGraw-Hill Publishing Co. Inc. All rights reserved. UNCONDITIONAL GUARANTEE: the publisher, upon direct request from any subscriber to our New York office, agrees to refund the part of the subscription price applying to copies not yet mailed.

Subscriptions to Chemical Week are solicited from management men in the Chemical Process Industries in administration, production and plant operation, design and construction, research and development, sales and purchasing. Position, company connection and nature of company's business, products and approximate number of employees must be indicated on subscription application. Send to address shown below.

SEND SUBSCRIPTION CORRESPONDENCE AND CHANGE OF ADDRESS TO FULFILLMENT MANAGER, CHEMICAL WEEK, 330 WEST 42nd ST., NEW YORK 36, N. Y. SUBSCRIBERS SHOULD NOTIFY FULFILLMENT MANAGER PROMPTLY OF ANY CHANGE OF ADDRESS, GIVING OLD AS WELL AS NEW ADDRESS, AND INCLUDING POSTAL ZONE NUMBER, IF ANY. IF POSSIBLE, ENCLOSE AN ADDRESS LABEL FROM RECENT ISSUE OF CHEMICAL WEEK. PLEASE ALLOW ONE MONTH FOR CHANGE TO BECOME EFFECTIVE.

Postmaster: Please send Form 3579 to Chemical Week, 330 West 42nd St., New York 36, N.Y.

FULLER PNEUMATIC CONVEYING SYSTEMS INCREASE PRODUCTION, CUT CONTAMINATION FOR GOODYEAR

Recent installation of specially engineered Fuller Airveyor® pneumatic conveying systems to handle pelletized rubber has helped Goodyear Tire and Rubber Company increase production. These systems are the latest Fuller design resulting from over 15 years experience in pneumatic conveying of rubber pellets. These completely enclosed automatic systems virtually eliminate contamination problems and greatly reduce the chance of loss due to spoilage.

Automated handling of crude rubber with Fuller Pneumatic Conveying Systems, in place of conventional rubber slab sheeting on a mill, is the key. One Airveyor system conveys the pelletized rubber from the pelletizer to a weigh station, a distance of 500 feet. Four more systems operate from the sink dump scales to inlet spouts of the finish-run Banburys.

All of these Airveyor pneumatic conveyors are of the vacuum type, employing positive pressure exhausters for air supply. Each conveying system is equipped with its own individual bag-type filter, automatic in operation, which provides for 100% visible dust retention. Exhausters and filters are located on the roof. A control panel permits manual or automatic operation of the entire handling system.

If you are handling dry, bulk, granular materials, a Fuller Conveying System application-engineered to your process can be equally advantageous. Look to Fuller, whose range of products coupled with experienced know-how offers you the best *single source* for solving pneumatic materials handling problems. Just call or write Fuller today outlining your problem—no obligation, of course. A-288 1954

FULLER COMPANY GENERAL AMERICAN TRADE MARK

FULLER COMPANY
144 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

Fuller
....pioneers in harnessing AIR

CRYSTALETS® · PALMILETS®

WILL ANSWER YOUR VITAMIN A NEEDS!

Pfizer Vitamin A Crystalets. **Dry, free-flowing Vitamin A acetate in an oxidation-resistant matrix of gelatin and sugar. The high stability of this form allows for reduced overages in meeting label claims. Available in potencies of 250,000 U.S.P. units and 500,000 U.S.P. units per gram.**

Pfizer Vitamin A and D Crystalets. **For economical inclusion of Vitamin D in your dry formulations. Available in two potencies—500,000 Vitamin A U.S.P. units per gram in combination with either 100,000 or 50,000 Vitamin D U.S.P. units per gram—Pfizer A and D Crystalets help simplify your manufacturing by permitting blending in various A:D ratios.**

Pfizer Vitamin A Palmilets. **A new form of Vitamin A Palmitate stabilized in gelatin expressly designed to solve the stability problem in high moisture products. Also available in combination with Vitamin D in a potency of 500,000 U.S.P. units of A and either 100,000 or 50,000 U.S.P. units of D per gram.**

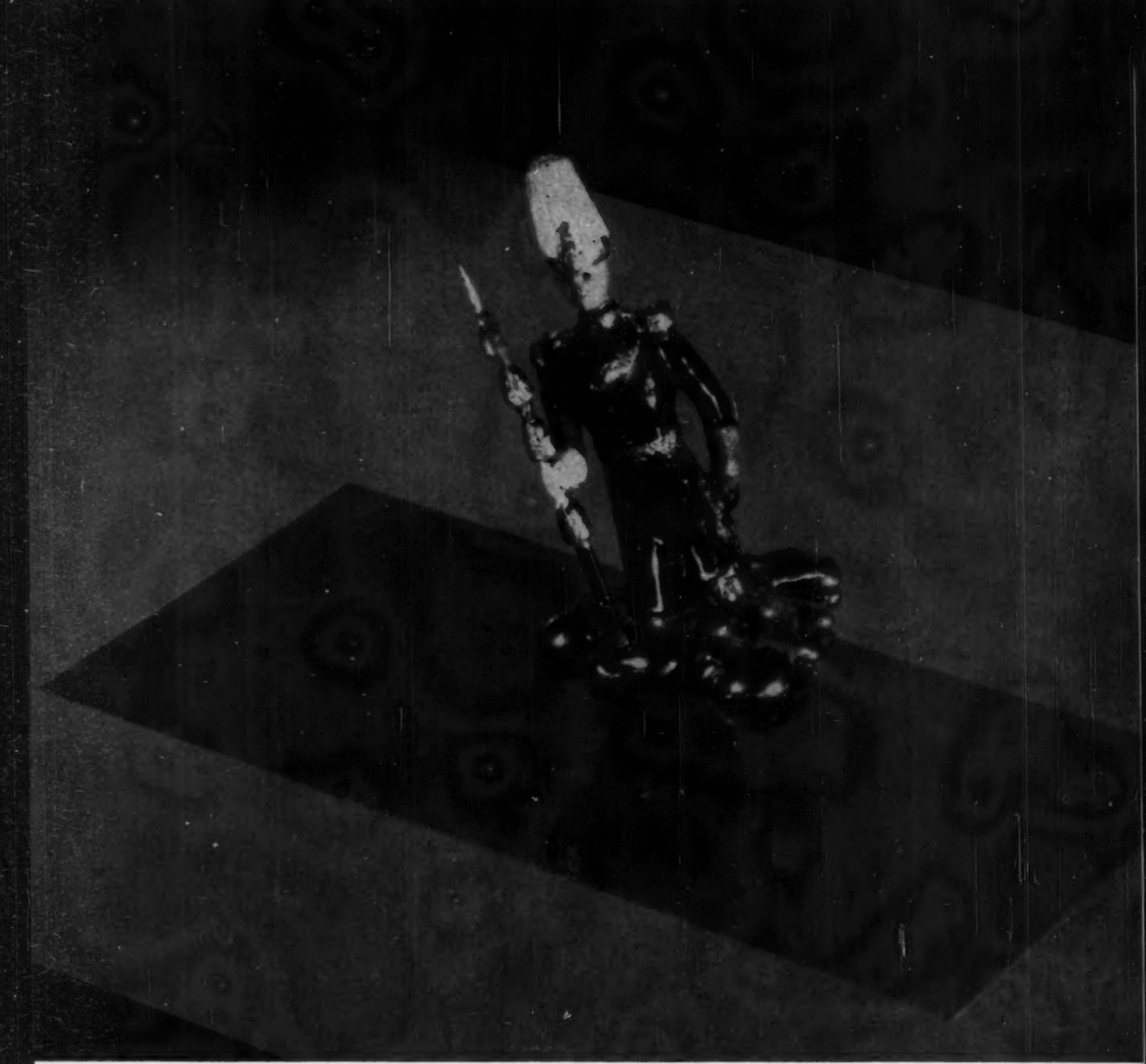
Pfizer Vitamin A Palmilets (Types M and W). **Two new dry, stabilized, dispersible forms of Pfizer Vitamin A Palmitate. Type M is dispersible in ice water while type W readily disperses in plain tap water. Both are highly stable and neither affect taste.**

Types M and W lend themselves ideally to the manufacture of soft compressed multivitamin tablets and dry pharmaceutical preparations where rapid solubility is required. Order in potencies of 250,000 U.S.P. units per gram. Also available in combination with Vitamin D in potencies of 250,000 U.S.P. units of A and 50,000 U.S.P. units of D per gram.

Science For The World's Well-Being **Pfizer** *Pioneer in the manufacture of vitamins*

CHAS. PFIZER & CO., INC.
Chemical Sales Division
630 Flushing Ave., Brooklyn 6, N. Y.

Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Tex.; Clifton, N. J.



The coating that heat can't fade away

A Glidden RUSTMASTER H.R. coating was applied to an outdoor hot plate. One year of 900° F. surface temperatures *and* constant exposure to all kinds of weather had no adverse effect on the heat and water resistant film. Unlike the old lead soldier the coating was unharmed.

This unique *outdoor* hot plate test, the only one of its kind, is just an example of the many ways all Glidden coatings are tested and proven.

Glidden Protective Maintenance Coatings are designed and specifically test-proven to match particular requirements wherever protection of chemical, railroad, petroleum, marine and industrial equipment is a problem.

QUALITY Glidden PRODUCTS

COATINGS FOR EVERY PURPOSE

The Glidden Company
INDUSTRIAL PAINT DIVISION
900 Union Commerce Building • Cleveland 14, Ohio
In Canada: The Glidden Company, Ltd., Toronto, Ontario

Write for your free copy of booklet containing complete information on all Glidden Protective Maintenance Coatings.

Chemical Week

Robert S. Muller ..... Publisher

Howard C. E. Johnson ..... Editor-in-Chief
Ralph R. Schulz ..... Managing Editor
Emil J. Mikity ..... Assistant Managing Editor
J. Robert Warren .... Assistant Managing Editor
Donald P. Burke ..... Associate Editor
Anthony J. Piombino ..... Associate Editor

DEPARTMENTS
Administration .... Cooper R. McCarthy, editor; F. Bryan Williams
Business News ..... Homer Starr, editor; Charles Joslin; Gary G. Reibsamen
Engineering ..... Ryle Miller, editor; Donald M. Levin
Foreign ..... Bruce Bendow, editor
Markets ..... Philip A. Cavalier, editor; Richard T. Ozimek
Production ..... Herbert C. Short, editor
Research ..... Joseph F. Kalina, editor; Philip A. Untersee
Sales ..... Carl A. Hiester, editor
Specialties ..... Richard J. Callahan, editor; Marion L. Meade
Reports ..... Jorma Hyypia, editor
Copy ..... William Mullinack, editor; Kay Sarner; Patty Moffitt
Art ..... Robert T. Martinott, director; Richard Kluga; Forbes Linkhorn; Dolores Able
Buyers' Guide ..... Betsy L. Emery, editor

REGIONAL EDITORS
Chicago ..... John M. Winton, editor; Nina Seawick
Houston ..... Thomas H. Arnold, editor; Wilma Cortines
San Francisco ..... Martin D. Robbins, editor; Terry Shaw

NATIONAL AND WORLD NEWS
Dexter M. Keezer ..... Economics
John Wilhelm ..... Director, News Bureaus

Domestic
Atlanta, B. F. Barnes; Chicago, Stewart Ramsey; Cleveland, Arthur Zimmerman; Dallas, Marvin Reid; Detroit, Donald MacDonald; Los Angeles, Kemp Anderson, Jr.; San Francisco, Jenness Keene; Seattle, Ray Bloomberg; Washington, George B. Bryant, Jr. Correspondents in 75 principal cities of the United States.

Foreign
Beirut, O. M. Marashian; Bonn, Pete Forbath; Caracas, John Pearson; London, John Shinn; Melbourne, Alicja Grobtuch; Mexico City, Peter Weaver; Moscow, Ernest Conine; Paris, Robert E. Farrell; Rio de Janeiro, Leslie Warren; Tokyo, Sol Sanders. Correspondents in 78 cities.

Knox Armstrong .... Advertising Sales Manager
Alvin J. Babkow ..... Business Manager
Fred E. Lesner ..... Sales Promotion Manager
John M. Pierce ..... Market Service Manager
Robert L. Maier ..... Advertising Makeup
Paul W. Erb ..... Circulation Manager
Frances Regan ..... Reprints
Advertising Salesmen ..... See Adv. Index

Next Year Is Too Late

TIME IS RUNNING OUT. Only five short months remain of the year's extension granted by the Food & Drug Administration in which the industry can get clearance of food additives and packaging materials in use since Jan. 1, '58.

FDA has granted extensions on long lists of additives submitted for approval (apparently without checking thoroughly because it doesn't have enough experienced personnel), yet the agency's backlog is huge.

Actually, it was obvious to many, over a year ago, that time would be short, that a year's extension was skimpy at best. Although the industry ostensibly has had about two years in which to file petitions—the Food Additives Amendment to the Federal Food, Drug and Cosmetic Act was enacted into law Sept. 6, '58—a great deal of time has been consumed in just finding out what additives are being used.

There is no need to heap criticism on FDA in this matter; the agency is requesting no more from industry than is required under the law—it is operating in line with Congressional intent. It is up to the Congress, when it convenes in January, to do something about changing that March deadline, since under the present law FDA was allowed to make one extension, and it has already exercised that prerogative.

But the puzzling aspect of the whole situation is this: most of the chemical and packaging people and associations, who should be marshaling forces now to exert pressure for early Congressional action, are doing nothing. This includes the Manufacturing Chemists' Assn., food can manufacturers, plastic film makers, flavor extract manufacturers, the paper industry, and other additives producers and users.

Kenneth Mulford, current chairman of MCA's Food Additives Committee, recently proposed one possible solution of the deadline problem. But he took particular care to emphasize that this was his "personal" proposal, that it was in "no way to be construed as reflecting the association's or the industry's view."

"The color amendment," he recently told American Bar Assn.'s Division of Food, Drug and Cosmetic Law, "points the way to a simple solution.

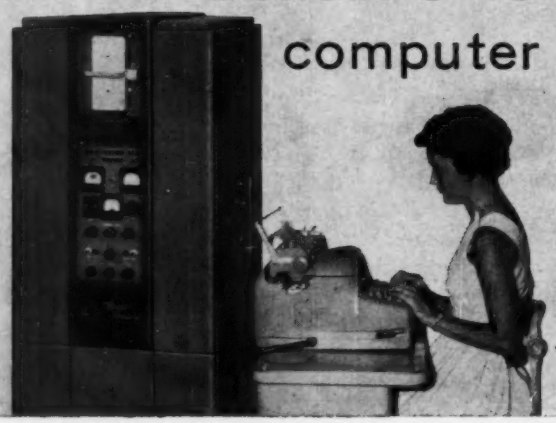
"Under this law, the closing date on the provisional listing or use of a color additive is open-ended, in the sense that the Secretary [of Health, Education & Welfare] may postpone the closing date if such action is consistent with the objective of carrying to completion, in good faith, the necessary scientific investigation [by petitioners]."

But why is the industry showing such reluctance to stir up agitation for more realistic legislation? Is it afraid that vocal opponents to additives in food will shout that the industry is trying to perpetuate the practice of "adding poisons to our foods for its own profit?"

The consequences to inaction now are many. Not only will confusion be rampant but also the law could actually break down for lack of enforcement. FDA just can't possibly push across-the-board enforcement, so what is done will likely be discriminatory to say the least. FDA understandably might pick only those items that appear to be simple to check. Dozens of products (many in use for years with no harm) that could not get FDA clearance would represent not only great loss to the industry in research time, effort and money but also possible detriment to the consuming public if such use should, of necessity, be stopped.

MCA, the flavor extract industry, the can and other food-packaging people should start pushing now for remedial action as soon as possible after Congress convenes in January. Time for action is running out.

...At the Dow Chemical Company, fiber research is optimized with a Bendix G-15 computer



Herman P. Briar

At Dow Chemical, Research Project Leader Herman P. Briar used the Bendix G-15 digital computer to speed research and reduce material costs in the development of the new synthetic fiber, *Zefran*. The versatility of the low-cost G-15 also permits its usage on other important Dow projects, including quality control, engineering, and market development.

More than 350 G-15's are currently in use, many in the chemical process industries. One reason for this popularity is that the new user, through the G-15 EXCHANGE Organization, may take advantage of the work already done in applying the G-15 to his type of work. For instance, in the chemical field, the new G-15 user would have access to a wide variety of programs including:

Process simulation • mass spectrometer calculations • pressure vessel design • column design • linear programming • probability analysis • statistical analysis • viscosity calculations • heat exchange calculations • information retrieval • regression coefficients • multiple linear regression • pipeline analysis • analysis of variance • numerical differentiation • quality control • random number generation • Fourier synthesis • and many more in engineering and business fields.

The G-15 has many other valuable features: very low price, the widest variety of standard accessory equipment of any computer, alphanumeric typewriter and paper tape input-output as standard equipment, simplified programming systems, nationwide service organization, and fast availability.

A Bendix Computer representative will be happy to discuss your computing needs in detail. Or, write for descriptive literature.

Bendix Computer Division
DEPT. AG-22, LOS ANGELES 45, CALIF.

The Bendix Corporation

LETTERS

Company Journals

TO THE EDITOR: Your interesting article, "Company Journals: New Research Voice" (*Sept. 17, p. 125*) omits much to my disappointment any mention of the "Monsanto Technical Review." The "Monsanto Technical Review" is now in its fifth year of existence. . . .

The "Review" is a compilation of papers written by Monsanto scientists and engineers that have been originally published in professional journals. It is published annually in the fall of the year and has a circulation of approximately 8,000. . . .

J. J. HEALY, JR.
Monsanto Chemical Co.
St. Louis, Mo.

TO THE EDITOR: Of course I am sure that your Research feature "Some Research-Oriented Company Periodicals" was not intended to include all the company publications that put stress on technical articles, but we do want to bring to your attention Aerosol Techniques' "Pressure Gauge," which contains an "Aerosol Technicomment" research article in each issue. . . .

LEO MILLER
Leo Miller Associates
Westport, Conn.

Metal Organics

TO THE EDITOR: The CHEMICAL WEEK report "Metal Organics" (*Sept. 17*) will certainly be a valuable reference work for many people in the chemical industries. For the benefit of your readers who do save this report, we would like to note corrections that apply to the products listed as supplied by Abbott Laboratories.

The formula for aluminum aspirin (*p. 62*) is not correct as printed . . . We no longer offer phenyl arsonic acid or 4-hydroxy-3-nitro-benzenearsonic acid. However, we do offer arsanilic acid (*p*-aminophenylarsonic acid).

In addition to arsanilic acid we offer the sodium salt (sodium-*p*-aminoarsonate). However, the material we offer is anhydrous sodium arsanilate rather than the tetrahydrate indicated (*p. 69*). Also, there is an extra hydrogen atom on the arsonic portion of the structural formula shown for sodium arsanilate.

We congratulate the author, Mr. A. R. Anderson, and CHEMICAL WEEK on this fine report. . . .

KARL BECK
Technical Service Manager
Chemical Marketing Division
Abbott Laboratories
North Chicago, Ill.

Penton Price Down

TO THE EDITOR: In reference to the article . . . titled "Powder Painting Potential" (*Sept. 3, p. 56*) you state that the price per pound for Penton is $5. . . . The last time Penton sold for $5/lb. was June 14, '59. Since then there have been two price reductions, the last of which was June 1, '60, when the base price of Penton molding powder was reduced to $2.50/lb. . . .

G. M. TAYLOR
Penton Sales
Hercules Powder Co.
Wilmington Del.

MEETINGS

The Magnesium Assn., 16th annual convention, Pick-Carter Hotel, Cleveland, Oct. 17-19.

Technical Assn. of the Pulp and Paper Industry, 15th plastics-paper conference, Hotel Syracuse, Syracuse, N. Y., Oct. 17-19.

Commercial Chemical Development Assn. (New York) and Chemical Economics Division of Chemical Institute of Canada, joint meeting, theme: "The Chemical Industry—Canada and the U.S.A."; Queen Elizabeth Hotel, Montreal, Oct. 18.

The Parenteral Drug Assn., Inc., annual convention, Hotel Statler Hilton, New York, Oct. 19-21.

American Institute of Chemical Engineers (New York Section); themes: "Unconventional Sources of Electrical Energy"; "New Developments in Chemical Engineering"; "Anatomy of a Profession"; Hotel New Yorker, New York, Oct. 20.

Technical Assn. of the Pulp and Paper Industry, 15th engineering conference, Robert Meyer Hotel, Jacksonville, Fla., Oct. 24-28.

Western Petroleum Refiners Assn., question-and-answer session on refining technology, Rufus Garrett Hotel, El Dorado, Ark., Oct. 26-27.

Building Research Institute, 1960 fall conferences, sessions on "preassembled components" and "structural foams," Shoreham Hotel, Washington, D.C., Nov. 15-17.

Rubber Vehicles

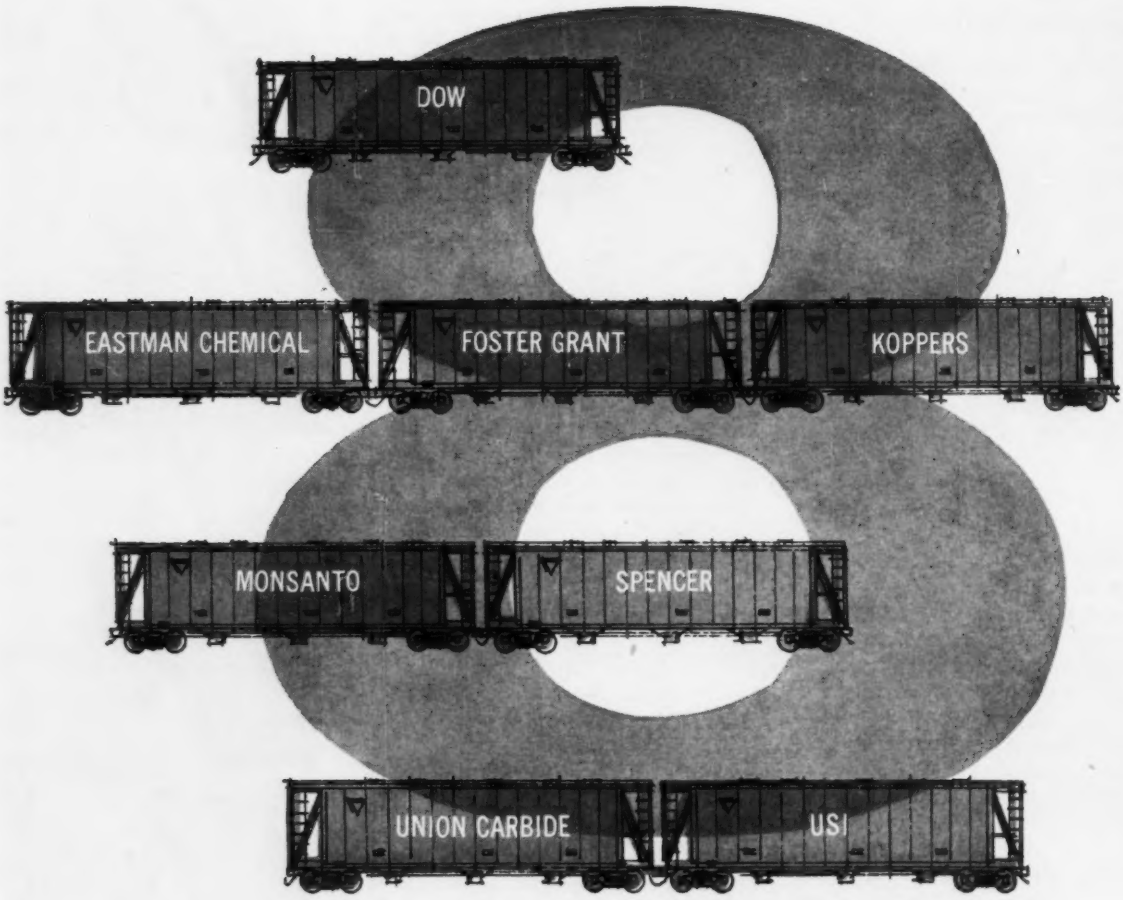
• Now for the first time, weather resistant Butyl Rubber is available in solution form with properties specifically designed for use in paint, caulking compound and mastic product formulations.

Butyl Rubber provides extreme resistance to:
WEATHERING • OXYGEN • OZONE • MOISTURE
ACIDS • ALKALIS • OXYGENATED SOLVENTS

Products Available	For use in
BU 1022, BU-1028	Mastic type surface coatings
BU 212	Coatings for brick, cement asbestos, concrete
BU 1017 BU 203	Coatings for asphalt shingle roofs
BU 129	Caulking compounds

SEND FOR FORMULATING INFORMATION, product literature, samples, and general brochure

CUSTOM POLYMERS, Inc.
1102 North Main Street
Princeton, Illinois
Telephone: 2-1022



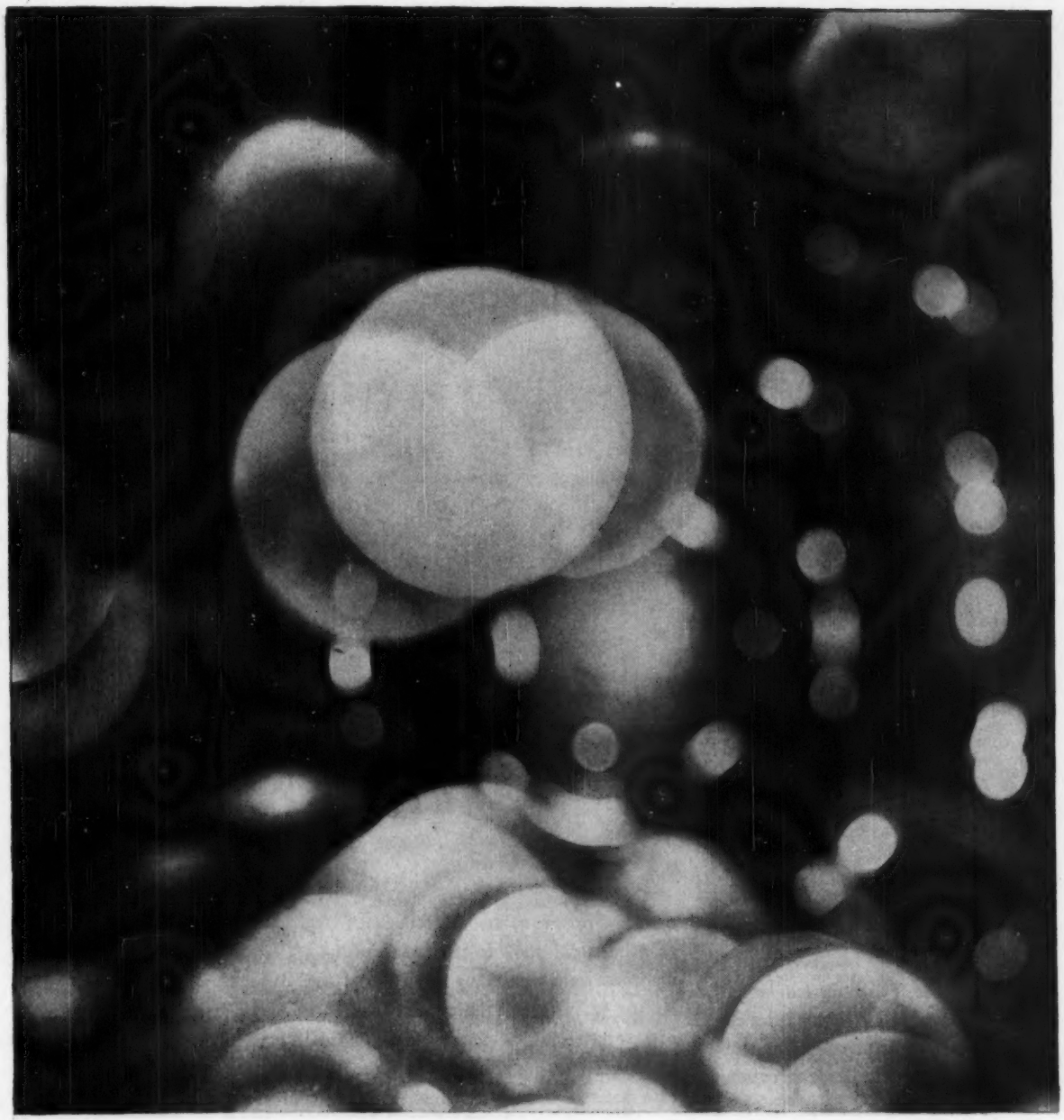
8 major chemical companies are now using the **DRY-FLO® CAR** for bulk shipment of **POLYETHYLENE** and **POLYSTYRENE**

Ask the nearest General American office about the advantages of bulk shipment for your product.

DRY-FLO GENERAL AMERICAN

Airslide® and Dry-Flo® Car Division
GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South La Salle Street • Chicago 3, Ill. • Offices in principal cities

The Dry-Flo® car provides maximum sanitation and full protection for materials that require careful handling.



Molecular magic makes an old product better, a new product possible when you

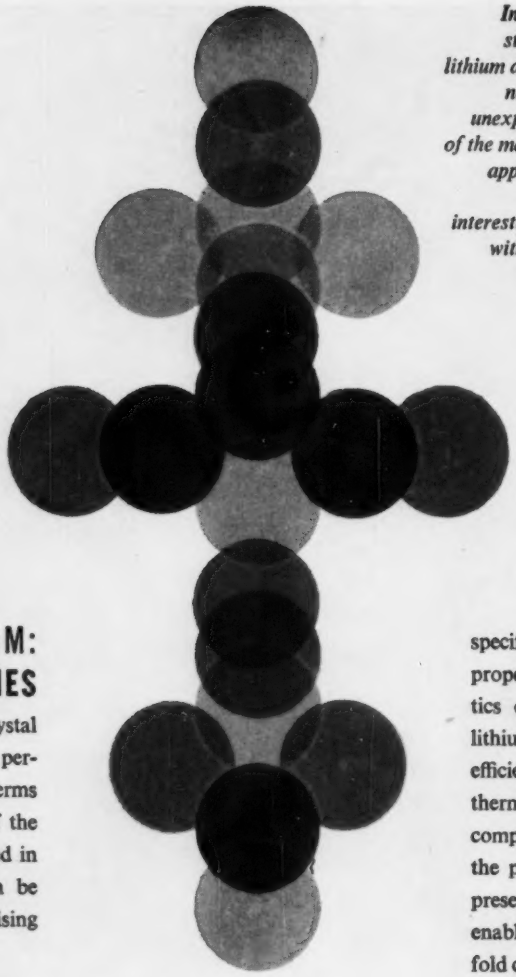
mix imagination with Alcoa Aluminas

Industrial magic—the magic of molecular action—has made ALCOA® Aluminas one of today's most rewarding product development materials. Ingredient, agent, reagent, catalyst or catalyst support, alumina in one of its varied types has sparked product and process development in industries ranging from ceramics to cosmetics, chemicals to paper, petroleum to rubber. The reason lies in the unique combination of physical, chemical, thermal and electrical properties which aluminas possess. And years of exploration have shown ALCOA the intriguing ways in which basic alumina molecules may be rearranged to provide crystal structures with the precise balance of properties needed by the individual user. Now it is possible to tailor the many types and grades of alumina to the exact needs of a specific product or process. Our White Data Sheets detail the properties of each grade and type of ALCOA Alumina available to speed your own product development activity. For a copy, write ALUMINUM COMPANY OF AMERICA, 707-K Alcoa Building, Pittsburgh 19, Pa.

ALCOA CHEMICALS

ALUMINUM COMPANY OF AMERICA

For finer products . . . let Alcoa add new dimension to your creative thinking!



In lithium's differences lie its greatest strengths. Nominally an alkali metal, lithium does not always act like its Group IA neighbors . . . earning it the tag, "the unexpected element." The gratifying fact of the matter is that lithium's most promising applications reflect its most unexpected properties. A number of the more interesting properties, all of them concerned with the solid state, are discussed here.

THE CASE FOR LITHIUM: SOLID STATE PROPERTIES

The wide range of ionic or crystal radii displayed by the alkali metals permits their nominal classification in terms of other cations for which each of the alkali metal ions may be substituted in crystal lattices. Thus, lithium can be associated with 21 elements comprising small crystal ions.

Mg^{2+}, Al^{3+}, Ga^{3+}, Cr^{3+}, V^{3+}, Ti^{4+}, Fe^{3+}, Ge^{4+}, Mo^{6+}, W^{6+}, Ni^{2+}, Co^{2+}, Fe^{2+}, Zn^{2+}, Sc^{3+}, In^{3+}, Zr^{4+}, Hf^{4+}, Sn^{4+}, Nb^{5+}, Ta^{5+}

By comparison, the larger sodium, potassium, rubidium and cesium ions can replace few other cations without materially distorting or disturbing the existing arrangement of lattice units. This size factor . . . plus the ability of lithium ions to aid in stabilizing ions of higher valence state in a host crystal . . . is responsible for the interesting catalytic or semiconductor properties common to mixed lithium oxide—transition metal oxide systems.

Oxides of the type:
$(Li_x M^{n+}_{1-2x} M_x^{2+}) O$ or $Li_x M_{1-x} O$,
where M is Mn, Fe, Co, or Ni, are p-type controlled impurity semiconductors of high electrical conductivity.

METALLURGY A small atom, plus high electronegativity permits lithium alone of all the alkali metals to be incorporated as a beneficial alloying constituent of numerous metals, including Mg, Cd, Al, Be, and Ag. In general, the lithium alloys of these metals exhibit increased strength and better working properties than the base material. One good example is the increased strength at higher operating temperatures of new aluminum-lithium alloy 2020. Lead-lithium alloys also have higher tensile strength than pure lead. By taking advantage of the excellent neutron absorption properties of the lithium-6 isotope, these alloys can be fabricated into excellent shields against thermal neutrons and gamma radiation.

CERAMICS The inclusion of lithium in glasses and glazes yields more condensed and compact structures with decreased thermal expansion and increased stability. It is still difficult to point to the specific atomic, molecular, and ionic properties on which these characteristics depend. But the growing use of lithium in ceramics with a very low coefficient of thermal expansion and high thermal shock resistance is being accompanied by increasing research into the physical chemistry of lithium. The presence of lithium in a glass structure enables the alumina ion to attain fourfold coordination, thus serving as a glass former. And lithium's small ionic radius permits a lithium ion coupled with an aluminum ion to displace two magnesium ions in the spinel structure.

MORE TO COME: The tale of lithium is neither easily nor quickly told. The material presented here constitutes the briefest of introductions. But if it has whet your appetite, we can happily provide you with more of the same—long on facts and ideas, short on flim-flam, and complete with derivations and references. Just write for a copy of "Lithium vs. The Other Alkali Metals". Foote Mineral Company, 420 18 West Chelten Building, Philadelphia 44, Pennsylvania.

AEROSOL® C-61

CATIONIC SURFACTANT

CYANAMID

Aerosol C-61, one of Cyanamid's cationic surfactants, is an ethanolated alkyl guanidine-amine complex of high molecular weight. A low-cost cationic emulsifying and dispersing agent, it has unique stability to strong acids and bases. Contains no sulfur or metallic ions—burns off completely at approximately 400°C, leaving no ash. Because of its cationic nature, Aerosol C-61 can be used to improve the substantivity of emulsions to various surfaces. Aerosol C-61 is especially effective in pigment dispersing, paint removal and acid cleaning solutions. Send for technical information today.

SOME PRODUCTS OF CYANAMID'S PROCESS CHEMICALS DEPT.:
ACCOBOND® Resins • AEROMET® Metallurgical Additive
AEROSOL® Surfactants • Ammonium Sulfate • Mineral Acids
CYQUEST 40® Sequestering Agent • Aluminum Sulfate
Products marketed under the trademark AERO *are:*
Calcium Carbide • Calcium Cyanamide • Cyanuric Chloride • Dicyandiamide
Glycolonitrile • Guanidine Hydrochloride • HCN (Liquid Hydrocyanic Acid)
Maleic Anhydride • Melamine • Metallic Stearates • Phthalic Anhydride

AMERICAN CYANAMID COMPANY
PROCESS CHEMICALS DEPARTMENT • 30 Rockefeller Plaza, New York 20, N. Y.

CWP-1015

American Cyanamid Company
Process Chemicals Department
30 Rockefeller Plaza
New York 20, N. Y.

Please send me free technical information about
AEROSOL C-61

Name_____
Company_____
Address_____
_____
Position_____

produce pesticides at a profit– PANASOL Solvents

Quality solvents, priced right, are what you get with PANASOL Aromatic Solvents. And you get on-time delivery which means you have the solvent you need when you need it. You turn over your inventory, you satisfy your customers because you give them top quality pesticides, and you make a profit. Experienced technical help on solvents is yours, too, from Amoco.

Quick facts about
PANASOL Solvents

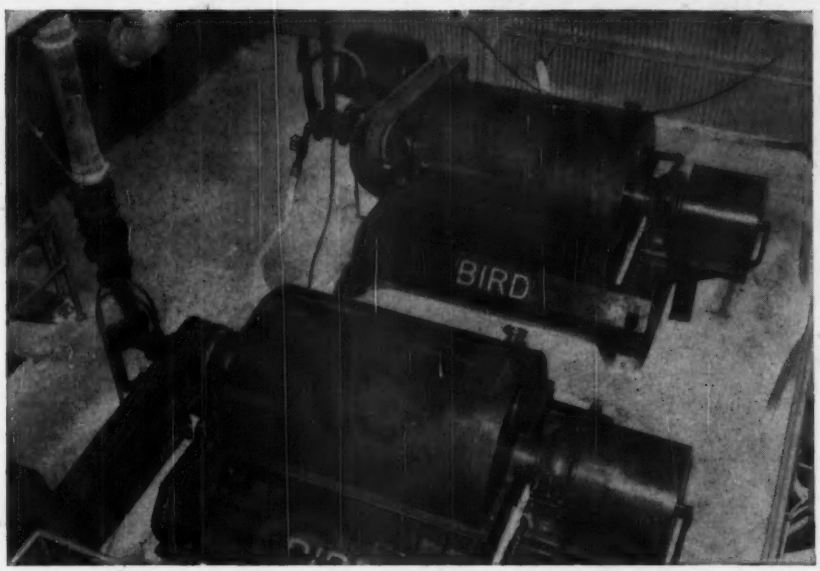
PANASOL RX-4. For formulations where low phytotoxicity is important. Excellent substitute for xylene. Very high K-B value and aromatic content. Particularly suited for corn and tobacco pesticides.

PANASOL AN-2. Extremely high solvent power. Almost completely aromatic. Ideal for highly concentrated solutions that require low temperature stability. Emulsifies easily. Particularly suited for specialty solutions such as 3.7 LB DDT.

AMOCO CHEMICALS CORPORATION
Department 4159
910 South Michigan Avenue, Chicago 80, Illinois

AMOCO CHEMICALS

By 1970 you'll appreciate the lasting value of your 1960 investment in **Bird Continuous Solid Bowl Centrifugals**



Here's why we can say this and make it stick:

After 28 years a producer of southern clays retired their first Bird. They now have eleven in operation. The veteran unit installed in 1932 had been on the job 24 hours a day right up to this year.

Still turning out a fine salt of satisfactory dryness, after 18 years. Question: Should this Bird be repaired or replaced? Answer: Fix it up and it'll be good for many more years of faithful service.

Never opened up for five years. Used for dewatering the lime in a water softening plant, the user writes: "Since the unit has not been opened since it was installed five years ago, it may be time to have a look inside and see if anything needs to be done."

"Another Bird that has been running 24 hours a day since 1940 without mechanical attention." So runs the report from a leading producer of inorganic chemicals, and it continues, "Even so, the repairs are quite minor."

A billion pounds of salt from caustic is the record of a Bird that has been on the job twenty hours a day for the past 8400 days (23 years). Only routine annual check-ups have been required.

These are the kind of service records that can be achieved when corrosion or abrasion do not present serious problems. Even when these are factors, Birds outlast and outperform other separating equipment.

GET THE FACTS, by all means, on comparative dryness of solids, clarity of filtrates, capacity and cost per ton. **The Bird Research and Development Center** stands ready to supply the figures based on pilot-scale tests of your own feed slurries. But keep in mind that Birds are built for the long pull — an investment that brings returns year after year after year.

BIRD MACHINE COMPANY

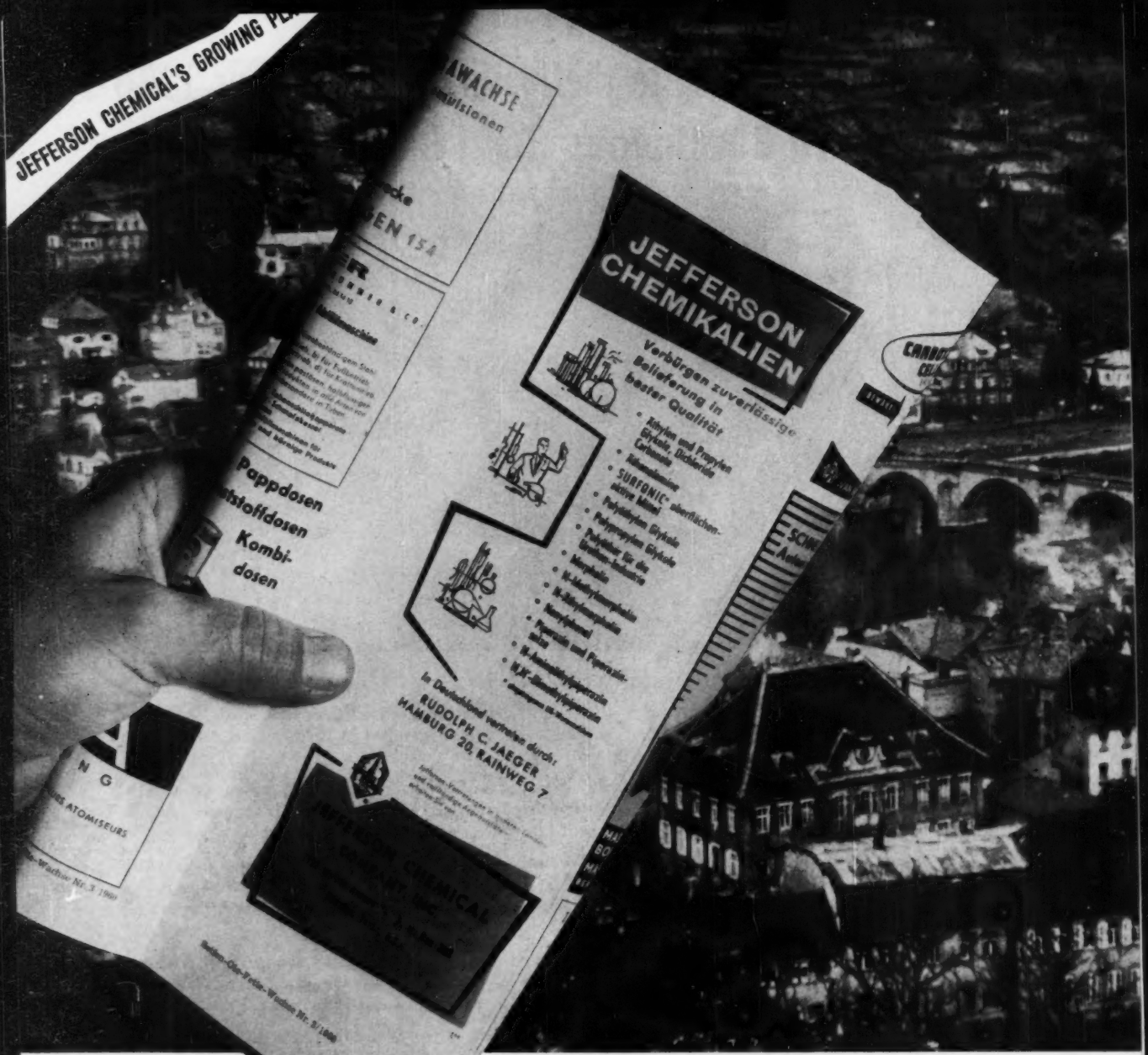
SOUTH WALPOLE, MASSACHUSETTS

BUILDERS OF THE COMPLETE LINE OF SOLID-LIQUID SEPARATING EQUIPMENT

Operators of the **Bird Research and Development Center** for pilot-scale testing to determine the correct equipment for the job. Yours to use.

Application Engineering Offices:

EVANSTON, ILL. • ATLANTA, GA. • HUNTINGTON, W. VA. • LAPORTE, TEXAS • WALNUT CREEK, CALIF.



IN DEUTSCHLAND *FRANCE • ITALIA • SUISSE*
BELGIQUE *NEDERLAND • UNITED KINGDOM*

Jefferson Chemical expands services abroad

Now, Jefferson will offer all the chemicals listed above throughout Free Europe in any quality and quantity desired. Veteran export chemical specialists are completing the assignment of additional agents and stockpoint facilities.

You may not be interested in "Propylen Glykole in Deutschland," but Jefferson's growing capabilities assure you of better service everywhere . . . Jefferson Chemical Company, Inc., 1121 Walker Avenue, P. O. Box 303, Houston 1, Texas.

HOUSTON • NEW YORK • CHICAGO
CLEVELAND • CHARLOTTE • LOS ANGELES

JEFFERSON CHEMICALS

Business
Newsletter

CHEMICAL WEEK
October 15, 1960

A fairly optimistic tone is expected in third-quarter reports. It's now clear that chemical companies' third-quarter and nine-month sales totals will be definitely higher than last year's; and some companies are making headway against the profit squeeze that marred so many second-quarter financial statements.

In August, sales of chemicals and allied products spurted to $2,380 million—up more than 11% over the Aug. '59 figure, which, of course, was held down by last year's steel strike. That brings this year's eight-month total to $18,640 million—11.4% higher than in the first eight months of '59, as computed by the U.S. Dept. of Commerce.

One company doing better than ever: Reichhold Chemicals, which posted nearly $9 million in sales during August. It was the best month in the company's history. In the eight months to Aug. 31, sales were up 5.6%, to $65.8 million; earnings climbed 17.2%, to $2.3 million.

There's no question but that some parts of the industry are in the doldrums. American Enka—producer of rayon and nylon fiber products—has decided to omit its fourth-quarter dividend payment because of unsatisfactory earnings and the need to conserve cash for capital expenditures. In the 36 weeks ended Sept. 11 earnings sagged more than 90%—from $5.3 million in '59 to $483,000 in the '60 period.

Another company in one of the economy's soft spots: Tennessee Products & Chemical (Nashville). Although TPC's chemical sales have been "excellent," its metallurgical operations—which normally account for 60% of the company's business—have been so slack that the company has just released six executives (including several high-ranking managers with long service) and 14 other employees to cut out "excess overhead."

•

Tennessee Eastman will go right ahead with its Kodel expansion despite last week's devastating explosion and fire at the Kingsport, Tenn., plant (*p. 25*).

The first units of the Kodel polyester fiber plant—which will eventually have a production capacity of 20 million lbs./year—are expected to go into operation on schedule during the fourth quarter of this year. The second phase of construction, just getting started, will be finished by the latter part of '61.

Only aniline production has been interrupted as a result of the explosion, Eastman says. The company has arranged to purchase sufficient aniline from other suppliers to prevent major interruption of shipments.

•

And California Chemical will produce aromatics in Europe (*CW, Oct. 8, p. 38*). The newly reorganized subsidiary of Standard Oil Co. of California will definitely go ahead with its $20-million joint venture with British Petroleum to construct two aromatic chemicals plants in

Europe. British Petroleum will operate the units on behalf of the jointly owned company, BP California.

The units—to be located adjacent to existing BP refineries on the Isle of Grant, Kent, England, and in Dinslaken, West Germany—will, in their initial phases, produce up to 42 million lbs./year of *o*-xylene, 36 million lbs./year of ethyl benzene, and 50 million lbs./year of *p*-xylene. Construction contracts have not yet been signed.

•

With Brazilian business prospects better than ever after last week's elections (*see p. 25*), look for an increase in the already sizable number of U.S.-backed CPI projects in that country. In the latest such venture, Union Carbide—which is involved in about a dozen Brazilian operations—will raise polyethylene capacity of Union Carbide do Brazil from 9 million to 24 million lbs./year at the affiliate's Santos plant.

•

Look for Rexall to branch into other chemical lines. First there was the big joint venture with El Paso Natural Gas in petrochemicals (*CW Business Newsletter, May 7*). Now Rexall is planning a series of significant moves into industrial agricultural and fermentation chemicals, polyvinyl chloride, polyurethanes, acrylics, copolymers, fibers and chemical intermediates.

At the same time, the company will be reorganized into five major divisions: chemicals, plastic processing, proprietary drugs, ethical and hospital. Primary chemical subdivisions will be these:

Fine chemicals — including pharmaceutical intermediates and eventually fermentation chemicals.

Plastics—including polyethylene, polypropylene, plastic foams, polystyrene and planned moves into polyvinyl chloride, polyurethane, acrylites and copolymers.

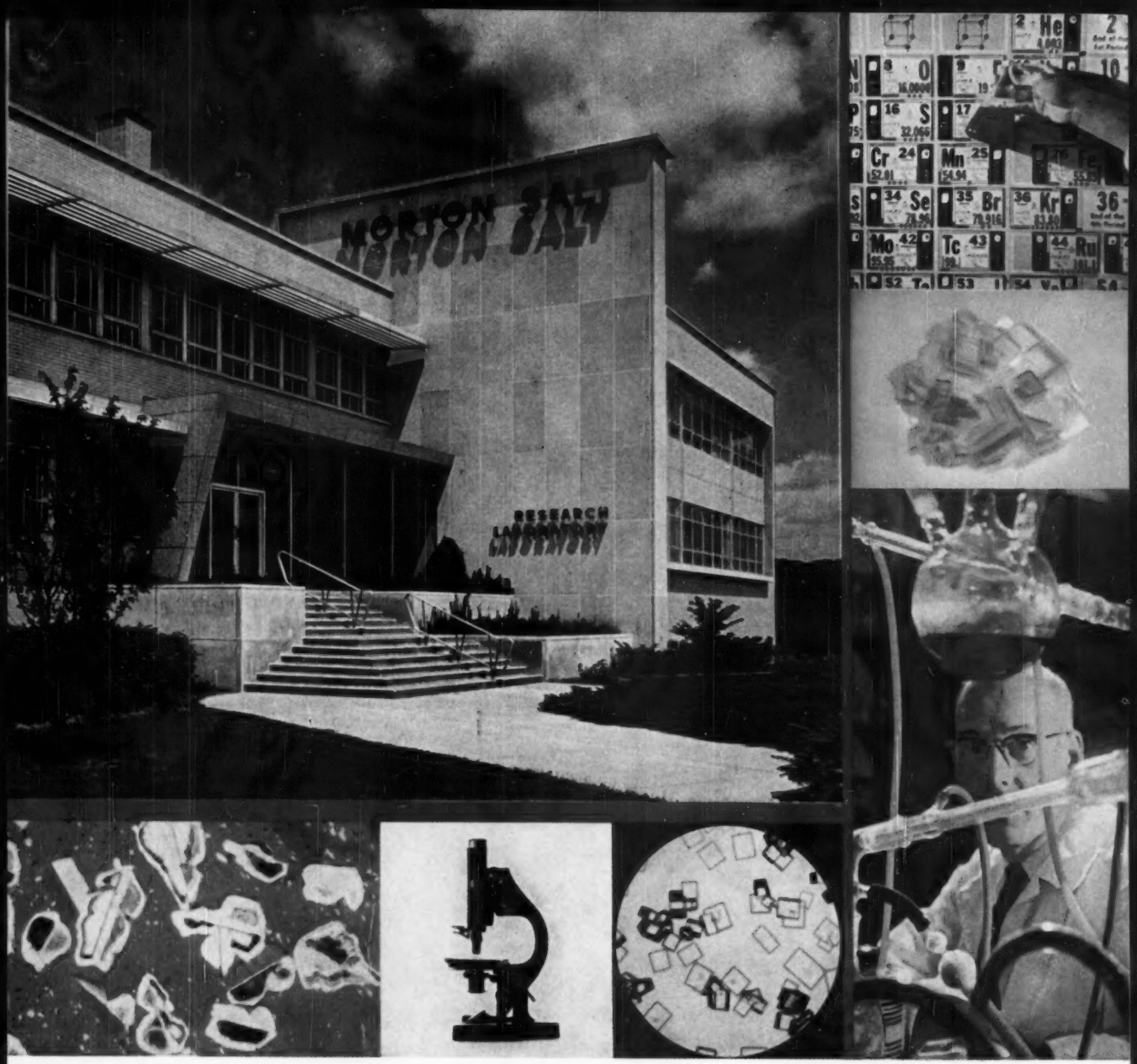
Industrial chemicals—which will also include chemical intermediates.

Agricultural chemicals—also a step yet to come.

The proprietary drugs division — planning a move into open-market drugs and open-market household specialties — will include the present-label products.

The ethical division will include present Rexall pharmaceutical subsidiaries Darwin Harvard and Shen Laboratories, which are both units of Riker Laboratories. Plastics processing will include subsidiaries Injection Molding Co. (IMCO), Chemtrol, Chippewa and Tupperware.

Also look for Rexall's newly arranged marketing organization to begin pushing polyethylene about the first of the year. Supplies will come from domestic producers at current low PE prices.



Only Morton offers salt service to industry everywhere in America

Morton has the largest, best-equipped salt research laboratory in the world. Located at Woodstock, Illinois, this ultra-modern research center gives Morton salesmen unequalled technical assistance with any problem pertaining to salt. Any problem your Morton Saltman personally can't solve can be referred to Morton's chemists for quick, thorough analysis. This technical service help Morton offers can be worth thousands of dollars to you every year.

Morton produces over 100 different grades of salt and can give you expert, impartial advice on which grade will do the best job for you. Whether you require high purity evaporated salt or ordinary rock salt, Morton can deliver it the fastest, most economical way. Because Morton has two or more sources for any grade you might require, you can count on delivery, even in the event of adverse conditions which might otherwise endanger the continuous operation of your plant.

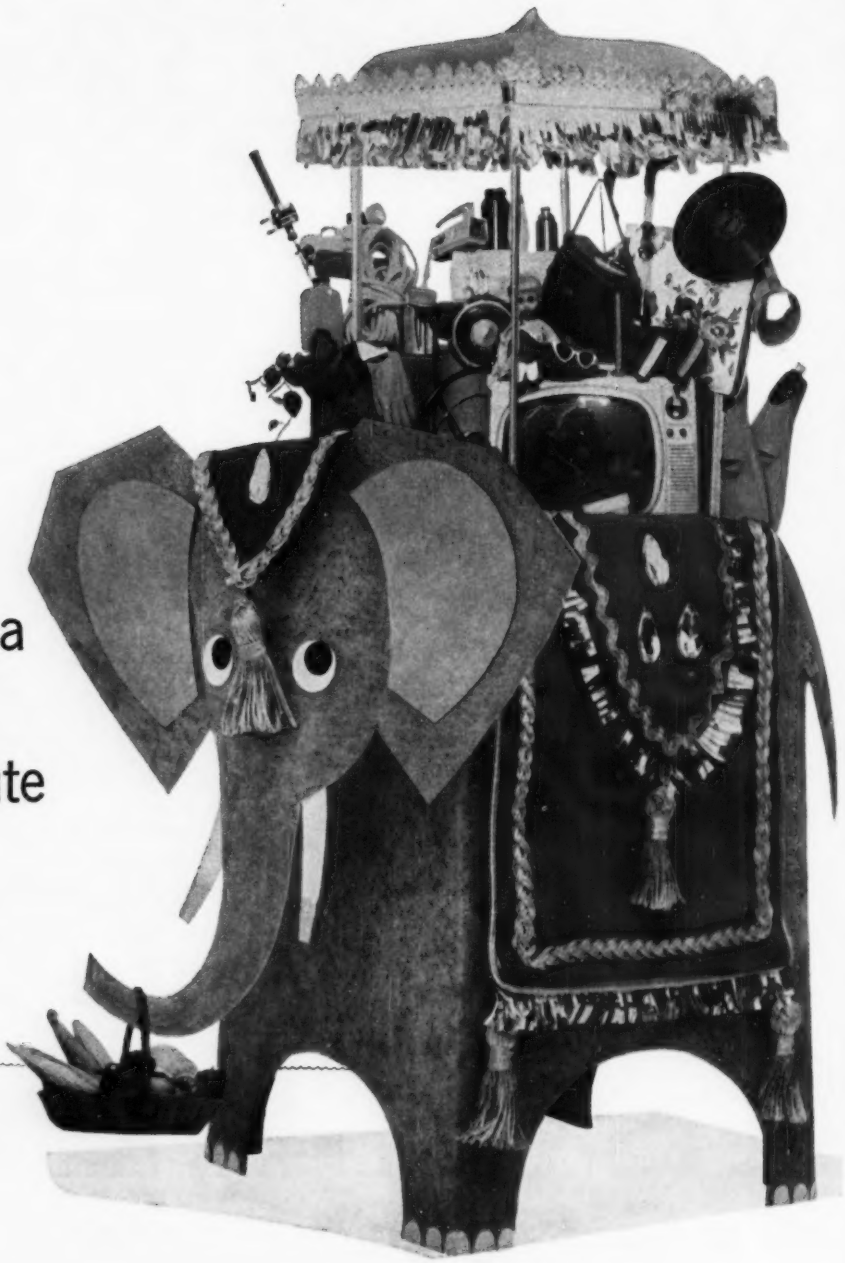
You can simplify problems of ordering, inventory and quality control by doing business with Morton. As the only nation-wide salt company, Morton is equipped to handle all your salt needs whether yours is a small specialized company with one plant or a large diversified company with plants in several locations.

MORTONSALT COMPANY

INDUSTRIAL DIVISION

110 N. Wacker Drive, Chicago 6, Illinois, Tel.: FInancial 6-1300

Vasco da Gama sailed an uncharted route



Vasco da Gama's route to the wealth of the East was uncharted. But when it comes to chemicals, you can steer a sure course to better, more uniform products when you use high quality Sinclair solvents.

Sinclair aromatic, aliphatic and odorless solvents set industry's standards for quality. These Sinclair solvents are available from nearby supply points–in the type of transportation equipment you require.

To guard against contamination, Sinclair ships aromatic, aliphatic and odorless solvents in three separate tank car fleets used exclusively for this purpose. For prompt, dependable deliveries, write or call...

SINCLAIR PETROCHEMICALS, INC.

Subsidiary of Sinclair Oil Corporation, 600 Fifth Avenue, New York 20, N.Y.

PARAXYLENE (98%) • PROPYLENE (99+%) • DURENE (1,2,4,5-TETRAMETHYLBENZENE) • ANHYDROUS AMMONIA • AMMONIUM NITRATE SOLUTIONS • AQUA AMMONIA • NITROGEN FERTILIZER SOLUTIONS • ALIPHATIC SOLVENTS • ODORLESS SOLVENTS • AROMATIC SOLVENTS • HEAVY AROMATIC SOLVENT TOLUENE (NITRATION GRADE) • XYLENE (FIVE DEGREE) • SULFUR • SULFONATES (OIL SOLUBLE) • CORROSION INHIBITORS • LUBE OIL ADDITIVES

Sinclair

emical Week
October 15, 1960

Fertilizer Makers Cultivate Profits

In the face of a slow-rising market and fierce competition, fertilizer makers are making a determined move to bolster their share of the U.S. market and to boost their earnings. Two tactics in the forefront this week: (1) upgrading products into higher-analysis grades; (2) vertical integration into mixing and distribution.

Figures for the 1959-60 fertilizer year aren't in yet, but estimates are not hard to find at industry meetings now taking place across the country. Best guess: although total bulk tonnage consumption held steady at about 24-25 million tons, consumption of nutrients (excluding filler materials) rose about 6% over the previous season's total.

Sales were spotty: they were down in the Southeast, the No. 1 consuming area, and in the Midwest, higher in the Missouri-Kansas-Oklahoma area and in the Far West. Main reason for sales drops: wet weather—many farmers delayed fertilizing or skipped one application; some never got around to it at all.

Leading industry authorities spot these sales trends:

All fertilizers—'58-'59, 25.3 million tons; '59-'60, 24.3 million tons; '64-'65, 25.7 million tons; '69-'70, 28.3 million tons (with substantially rising nutrient concentration each year).

Anhydrous ammonia—'59-'60, 4.9 million tons; '69-'70, 6 million tons.

Phosphate fertilizers (P_2O_5 content)—'59-'60, 14.7 million tons; '69-'70, 18 million tons.

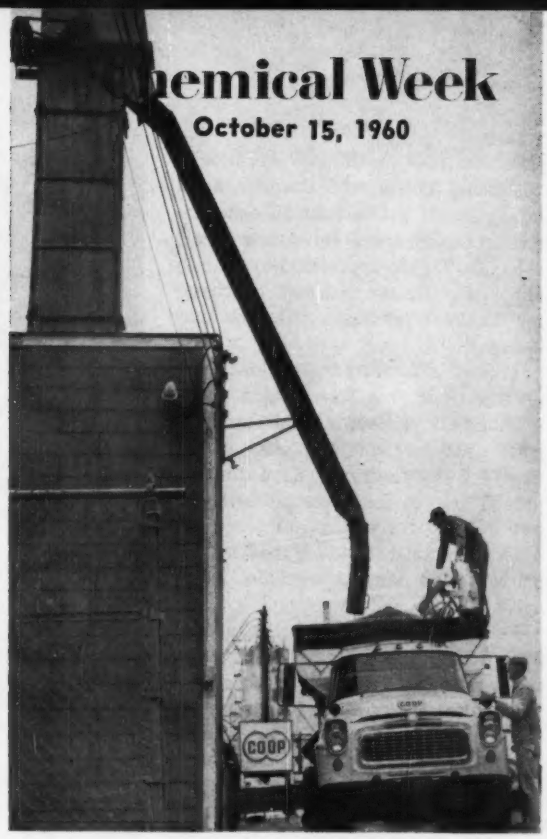
Potash fertilizers (K_2O content)—'59-'60, 2.1 million tons; '69-'70, 2.5-3 million tons. (*For more news of potash, see p. 89.*)

Closer to Consumers: Latest example of the basic fertilizer producers' drive to move closer to their customers is last week's acquisition by International Minerals & Chemical of E. Rauh & Sons Fertilizer Co. (Indianapolis), operator of three Midwestern plants with markets in five states. This sort of integration of marketing with basic production has been one of the industry's prime profit-boosting strategies.

IMC has been strong for integration: in Aug. '59 it bought Moneka Farm Stores (Bartlesville, Okla.) and Miami Fertilizer Co. (Trebein, O.), and earlier this year it acquired Welcome Agricultural Chemical Co. (Welcome, Minn.)

Others have moved the same way. U.S. Industrial Chemicals bought Federal Chemical (mainly because USI needed an outlet for a surplus of phosphoric acid). Also in the past year or so, Stepan Chemical picked up Ris-Van, Royster acquired Price, and Smith-Douglass bought Smith Agricultural Chemical.

Petroleum companies, now solidly in ammonia, are also tending to go all the way, adding phosphoric and potash production as well. Example: Phillips Petroleum's hook-up with National Farmers Union. Aside from a



The materials-handling techniques shown in these loading and storage scenes illustrate dry bulk: a fertilizer industry trend, it helps cut distribution costs. Also helping makers increase profits: upgraded products, dry blends, integration of marketing, new compounds, higher nutrient concentration.

favorable raw material situation, oil companies have a made-to-order marketing setup: gas stations all through fertilizer-using areas. Nevertheless, results thus far are understood to be disappointing. Reason: farmers' purchasing habits traditionally are slow to change.

This is also a stumbling block to another trend: bulk distribution (i.e., loading bulk product into the farmer's truck, rather than supplying it in bags) of dry fertilizers. Such an approach has obvious cost advantages, but it calls for the introduction of modern materials-handling methods in places where they never have been tried before.

Bulk distribution is, however, taking hold. Some predict that it will account for as much as 40% of the market by '75. More conservative (and probably more accurate) estimates peg it at a high of about 15%.

Hand in hand with bulk distribution is dry blending of nutrients—a physical mix rather than the more usual chemical compounding. Segregation of nutrients is a real problem here, but recent technology (promoting uniform partical size for all ingredients) is getting results.

Other evidence of upgrading is also seen in new fertilizers. Perhaps the most intriguing to the industry are the ammonium phosphates—particularly diammonium phosphate—complete plant foods. Some fertilizer makers are shying away because, like distribution integration, the ammonium phosphates would tend to put them into competition with their best customers, the distributors. A major function of the distributor is to mix the raw material ingredients; this step is bypassed when a complete plant food is supplied by the basic manufacturer.

Next major development in fertilizers should be the so-called "complex" or three-nutrient products, already a factor in the European market (where agricultural land must be husbanded) and beginning to appear here. As population continues to mushroom, U.S. agricultural surpluses may become a memory, and more care will have to be taken with U.S. farm land. This, the industry thinks and hopes, will mean more fertilizer sales and more sophisticated—and more expensive and more profitable—products.

WIDE WORLD

In Lynn, Mass., pickets taunt salaried GE employees at plant gate.

How GE Strike Hits CPI

The biggest strike of the year—last week's walkout by 70,000 International Union of Electrical Workers members at 55 of General Electric's 166 plants—appears to be having limited effect on buying and selling of CPI equipment and materials.

Six of GE's 21 Chemical and Metallurgical Division plants have been shut down by the strike, according to a company spokesman. He estimated that inventories warehoused at the struck plants would enable the plants to continue filling orders for from four to six weeks. He also said that GE has been able to make deliveries of chemicals and equipment ordered from strikebound plants.

The struck plants have ceased purchasing chemicals from their suppliers for the duration of the strike. However, GE has arranged to procure its chemicals for internal use from "outside sources" in situations where such chemicals—normally manufactured by any of the struck plants—are needed.

In all struck units except the one at Schenectady, N.Y., technical and research staffers and sales personnel are continuing their work despite the picketing.

Of the six chemical and metallurgical plants being struck, three are among GE's top chemical operations:

- Silicone Products Dept. at Waterford, N.Y., which manufactures and markets a comprehensive line of silicone products, including silicone rubber compounds and gums, silicone fluids for polishes and cosmetics, and silicone chemicals.
- Insulated Materials Dept. at Schenectady, N.Y., producer of such electrical insulating materials as mica mat, coated materials, adhesives, irradiated materials, wire enamels, paints and varnishes.
- Chemical Materials Dept. at Pittsfield, Mass., manufacturer of phenolic molding compounds, foundry resins, coating resins, and fused magnesium oxide.

Other GE chemical departments affected: Conduit Products Dept. at Niles, O.; Major Appliance Division at Louisville, Ky.; and Wire and Cable Dept. at Bridgeport, Conn.

Several departments that produce equipment for CPI companies have also been affected by the IUE walkout. Among these: Transformer Dept.'s plants at Pittsfield and Holyoke, Mass.; the switchgear plant at Philadelphia; all units of the turbine operation; the Instrument Dept.'s West Lynn, Mass., facility; and most of the Tube Division.

Sales of U.S.-Owned Chemical Plants Abroad

(Million dollars. Source: U.S. Dept. of Commerce.)

Year	Canada	Latin America	Europe	Other Areas	All Areas
1957	897	499	822	193	2,411
'59	1,060	590	1,030	260	2,940
Two-year increase:	18.2%	18.2%	25.3%	34.7%	21.9%

U.S. Investments in Chemical Plants Abroad

(Million dollars. Source: U.S. Dept. of Commerce.)

Year	Canada	Latin America	Europe	Africa	Asia	Oceania	All Areas
1950	198	205	74	9	12	13	512
'57	647	334	319	12	40	27	1,378
'59	742	361	440	15	59	40	1,657

Flourishing on Foreign Soil

American-owned chemical operations in other nations have been showing a faster growth rate than the chemical industry within the U.S., according to a new government survey out this week.

This survey—the U.S. Commerce Dept.'s latest census of U.S. private foreign investment—shows that during the past two years American investments in chemical plants abroad have increased 20% and that those plants' sales have climbed 22% (*see tables*).

In comparison, other government reports have shown that for the U.S. chemical industry over the same period, net worth of plant and equipment rose 14% and total sales of chemicals and allied products were up 10%.

Chemicals Top Choice: Also revealed by the new census: private U.S. investors have been putting more money into foreign chemical plants than into foreign plants of any other manufacturing industry, and this rate of investment in chemical plants helped boost total U.S. interest in foreign manufacturing plants almost to the total level of investment in petroleum facilities.

Manufacturing plant investment abroad now is $9.7 billion—lifted to this mark by the more-than-$1-billion outlays in '59; there is some $10.4 billion in U.S. money in overseas petroleum plants (about $600 million was spent on oil facilities in '59).

In the manufacturing category, which received 40% of total U.S. foreign investment last year, the chemical and allied industries segment in '59 could claim a total investment of $1,675 million; transportation equipment, $1,602 million.

In annual sales, the ranking of those two industries are switched. Transportation equipment plants moved a total of $5,360 million worth of goods in '59; chemical shipments were valued at $2,940 million.

Europe Forges Ahead: Up until the past few years, Canada and Latin America were the vastly preferred locations for American-sponsored chemical plants; but now the speediest buildup is in Europe. This trend carries over into other manufacturing industries; about 45% of the past year's outlays for foreign manufacturing plants went to Europe.

The United Kingdom received more than half of the European total, with France and Germany also scoring large gains. Since '50, U.S. investors have put some $2 billion into manufacturing enterprises in Europe.

Impact: This is the first time the census has included figures on sales of U.S.-owned productive facilities abroad, including sales to the U.S. These give at least a rough measure of those operations' competitive impact on domestic industry and on the U.S. balance of international transactions. And this may be the most vital aspect of the census.

The U.S. lost more than $7 billion in gold and dollars on its international transactions during the past two years, and is expected to lose approximately $3 billion more this year. Losses of such magnitude threaten to force the government to reconsider at some stage its liberal foreign trade and aid policies—and perhaps also to consider imposition of controls on foreign investment.

As to problems of competition, these general conclusions seem warranted by the new census.

- A calculation of the capital and trade flows into and out of the U.S. resulting from direct investment abroad is simply too narrow to give adequate measure of the over-all competitive problem posed by foreign investment.
- In terms of world trade significance, gross sales of U.S. overseas enterprises most directly affect U.S. exporters of similar goods. These foreign enterprises do little exporting to the U.S., however.
- Those U.S. manufacturing investments in Europe pose a more serious competitive threat than do direct U.S. investments in Latin America, Canada, or elsewhere.

U.S. imports of manufactured goods produced by American overseas enterprises totaled about $1 billion in the census year. Of this total, 80% came from Canada—mostly newsprint, wood pulp and aluminum. The most competitive imports came from Europe, totaling $200 million and including some chemicals. But those companies' exports to the U.S. were only about 5% of their total sales.

In the long run, industrial development anywhere may mean larger markets for everybody. But the relative position of the U.S. still can change for the worse—as that of Britain has changed vis-à-vis the U.S. And with U.S. companies—chemical and otherwise—carrying on overseas more and more of their total operations, the U.S. may be losing out on export opportunities that could help offset the outflow of gold and dollars.

CW PHOTO

Rudolph: Driving force behind an ambitious new beryllium company.

Buying Up the Beryl

Out to cinch a big share of the projected multimillion-dollars/year business in domestic beryllium ore, Beryllium International (Washington, D.C.) last week staked 19 new beryllium claims in Utah's Topaz Mountains area. This new batch brings the company's total of optioned holdings to more than 100 claims—20 acres each—on lands with "promising" beryllium ore.

Lawyer Charles Rudolph, 47-year-old president of Beryllium International, states that the company now has more claims than any other beryllium ore company in the U.S. Rudolph expects the total to be 250 after present plans and negotiations have been completed. In the works: a merger with American Beryl (Denver). This would give Rudolph's year-old concern a froth-flotation beryllium mill and 71 additional claims in the Crystal Mountains region of Colorado.

Far-Flung Holdings: Beryllium International has sizable blocks of claims not only in Utah but also in Idaho, New Mexico, Arizona and Canada. Rudolph is negotiating for claims in North Carolina and has made "stock transfer arrangements" with a firm in Australia in case workable deposits of beryllium crop up there.

The year-old Beryllium International is guided by a seven-member board headed by Rudolph. The board prefers to restrict the sphere of the company's activities to beryllium. Rudolph had recently urged the board to buy U.S. Oil Co. (Atlanta) but was vetoed. Later, with other financial backing, he personally bought the oil company.

Stock May Be Offered: Beryllium International is financed entirely by silent partners. It has a proposed capital structure of 5 million shares of par 25¢ stock. Rudolph says it may be publicly issued soon—though he would prefer not to do so. He reports that there have already been bids of 50-75¢/share, even though the stock is not yet available.

Rudolph's previous interest in beryllium led him to establish Beryllium International. He is a corporation lawyer and at one time—as president of the Chesapeake and Colorado Corp. (a consolidation of a number of mining and oil interests)—was associated with the far-flung Floyd Odlum enterprises, which now include a competitor, Beryllium Resources.

'Who's Who' Directorate: His associates in Beryllium International make an imposing list of names: John Marshall, former U.S. assistant attorney general; Cloyd M. Smith, mining engineer, consultant and beryllium expert (the one technical man at BI's top level); Edward B. Burling, Jr., partner in the Washington law firm of Covington and Burling; Edgar J. Goodrich, with the law firm of Gugenheimer, Untermeyer & Goodrich, and a former U.S. Court of Tax Appeals judge; Thomas W. Fribley, executive vice-president of Cleveland Cap Screw Co.; and Miles L. Beam, geologist-lawyer and vice-president of a Washington lumber yard.

Rudolph is convinced that beryllium is the metal of the future and will, in time, become one of the major industries in America.

"The government is doing a tremendous amount of beryllium research," he said, pointing up where the new applications would lie. "But industry will use more beryllium than it has been consuming."

He believes that the price will be reduced materially (from its present $60-70/lb.), although he suggests that this may be slow in coming about. He cites the newly discovered North American beryl ore deposits and technical advancements in ore separation as factors that will lead to price cuts.

Justice Dept.'s Rogers: Four big chemical cases filed since mid-'58.

Melamine 'Monopoly'?

Continuing the aggressive antitrust enforcement policy that now has sparked four major suits concerning chemical products in the past two years*, Attorney General William Rogers last week leveled a "monopoly" accusation against American Cyanamid on its melamine business.

Rogers and his No. 1 assistant for antitrust, Robert Bicks, charge that for the past 23 years Cyanamid has been using its patents, its know-how, and its position as a basic producer of dicyandiamide, melamine and melamine products to ward off competition in this field in the U.S.

They assert that this has been carried out through the acquisition of two producers of melamine-based end-products—Formica Co. and Panelyte Division of St. Regis Paper Co.—and through agreements with six companies that are cited in the complaint as co-conspirators (but not as defendants): Monsanto Chemical, Ciba Ltd., Ciba Products Corp., British Industrial Plastics, Societé des Produits Azotes, and British Oxygen Co.

Cyanamid was quick with a denial. "We are confident that all of our activities in this area have been lawful," a Cyanamid spokesman tells CHEMICAL WEEK, "and we propose to defend our position vigorously."

Divestment Demanded: Rogers and

* Three others: against polio vaccine producers, case dismissed (CW Business Newsletter, Dec. 5, '59); against leading U.S. citric acid producer (CW Business Newsletter, June 7, '58); and against certain tranquilizer producers (CW, Feb. 6, '60).

Bicks are asking the federal district court in New York to order Cyanamid to spin off its Formica and Panelyte acquisitions. Also, they want the court to prohibit Cyanamid from refusing to sell dicyandiamide, melamine or melamine products to anyone willing to purchase these materials at reasonable prices; and they're asking a broad decree forbidding any "continued" attempt to restrain trade in the melamine line.

On top of all that, Rogers and Bicks suggest that Cyanamid be enjoined from continuing to produce or sell melamine or melamine products. This would cut down Cyanamid's role in the melamine plastics field to producer of dicyandiamide, the principal starting material for melamine resins.

One Big Producer: The government's complaint states that Cyanamid accounts for nearly all of the dicyandiamide produced in North America, and that most of its "dicy" is used in production of melamine.

The Justice Dept. estimates that Cyanamid produced 86% and Monsanto produced 14% of the nearly 60 million lbs. of melamine—worth some $16 million—turned out in the U.S. in '58. Cyanamid's 50-million-lbs. output that year was called more than 50% of world melamine production. Domestic sales of melamine-containing products that year are put at 98.8 million lbs., valued at $39.4 million.

Specific charges in the government's complaint:

(1) That prices of melamine and melamine products were held at unreasonably high levels.

(2) That competition between producers of melamine products was suppressed, as well as foreign and domestic competition in the production of melamine itself.

(3) That the companies named in the complaint blocked progress in finding raw materials other than dicy for production of melamine.

(4) That progress in development of new uses for melamine was impeded.

(5) That the public was deprived of an ample supply of melamine and melamine products.

Next move will be Cyanamid's; the company will probably file an answer to the 13-page complaint within the next few weeks. Actual trial of the case may be a year or two away.

Brazil Likes Its Boom

Election last week of conservative, pro-U.S. Janio Quadros da Silva to be the next president of Brazil appears to offer enhanced security for U.S. chemical investors there. It also appears to hold promise of continuing industrial expansion that could mean need for substantial new American investment.

These conclusions seem justifiable because Brazil's chemical industry is expanding at twice the pace of its economy as a whole (*CW, Aug. 13, p. 28*). And its new president is expected to continue outgoing President Kubitschek's policies of increased industrialization and to further encourage the influx of foreign capital.

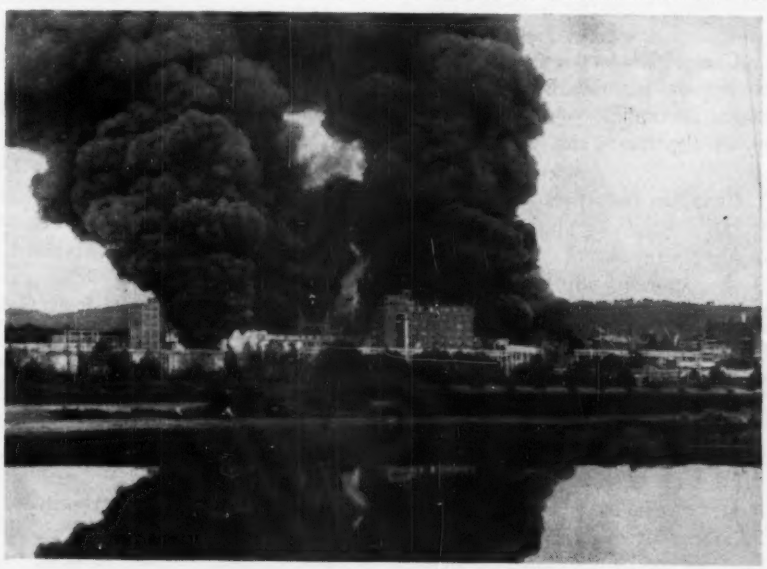
In pre-election speeches, Quadros promised to continue the economic growth of Brazil at a fast rate. However, he faces financial problems of inflation, shrinking foreign exchange reserves, a foreign debt of more than $2 billion, and probable year-end unfavorable trade and payment balances.

Although the U.S. supplied 40% of Brazil's '59 chemical imports and Brazil depends to a great extent on loans from the U.S. and the International Monetary Fund, U.S. chemical companies—with a current $1.5-billion investment in Brazil—face a strong challenge from foreign companies in further development.

Austerity Without Pain

West Germany's thriving chemical industry expects to take in stride the Adenauer government's austerity proposals—abolishing a tax on imports; ending a tax rebate for export sales; a big increase in aid to underdeveloped nations; and ending the East German trade pact.

The import tax doesn't apply to principal chemical imports, and the big chemical firms that do most of the exporting can easily absorb the loss of the rebate. Shipments to East Germany account for only about 2% of West Germany's $1.3-billion/year chemical exports.



UPI

Blast Casts Its Pall over Kingsport

One of the worst chemical plant disasters since World War II, an explosion and fire last week killed 13 employees and injured about 200 others at the Tennessee Eastman Co. plant at Kingsport, Tenn.

Company officials said the explosion took place in the aniline unit of the organic chemicals division, but they were still trying to determine the cause.

"Extensive damage" was reported to facilities in the immediate area of the explosion, but most of the other units in the big plant were back in operation within two days.

COMPANIES

Godfrey L. Cabot, Inc. (Boston), has merged with three of its subsidiaries—Cabot Carbon Co., Cabot Shops, Cabot Gasoline Corp.—and changed the parent company's name to Cabot Corp. Among Cabot's products: carbon black, natural gas, liquefied petroleum gases.

•

Phoenix Steel Corp. (New York) has purchased Colorado Fuel & Iron Corp.'s (Denver) Claymont, Del., steel plant. The sale increases Phoenix's annual ingot capacity 506,500 tons.

•

Minerals Engineering Co. (Grand Junction, Colo.) and Susquehanna-Western (Denver), subsidiary of Susquehanna Corp. (Chicago), will jointly produce vanadium pentoxide in a newly acquired plant near Salt Lake City, Utah. Minerals Engineering now produces tungsten; Susquehanna manufactures metallurgical and chemical products including vanadium. The joint venture anticipates sales of nearly $2 million/year with an "entirely new" process for chemical extraction of vanadium from heretofore wasted vanadium-bearing slag.

•

AviSun Corp. (Marcus Hook, Pa.) will move its executive offices to the Philadelphia National Bank Building, Philadelphia, about Dec. 1.

•

General Dispersions (Paterson, N.J.) will be moving to its new plant in Bloomfield, N.J., Nov. 7. In the larger Bloomfield plant it will expand production of nylon dispersions and its other product lines.

•

Canadian Industries (Montreal, Que.) has purchased R. D. Cattermole and M&D Industries, both British Columbia producers of molded polyethylene products. Both operations will be continued under their present names and managements.

EXPANSION

Oxygen: Air Products (Allentown, Pa.) has set Feb. '61 as completion date for its $10-million oxygen plant being built in Cleveland. The plant will be one of the largest on-site oxygen plants in the country, will supply 500 tons/day of pure oxygen to Jones & Laughlin steel furnaces and an additional 70 tons/day of liquid oxygen to nearby industries.

•

Sulfur Dioxide: Stauffer Chemical (New York) will complete its first sulfur dioxide plant next month at Baton Rouge, La. The plant—rated at 10,000 tons/year—will supply liquid sulfur dioxide to the pulp and paper industry.

•

Phosphates: Electric Reduction Co. (Toronto, Ont.) has started construction of a 100-acre chemical plant at Port Maitland, Ont. It will produce phosphate fertilizers, phosphoric acid and dicalcium phosphate (*CW, Oct. 1, p. 25*). Completion is scheduled for March or April. Cost: about $12 million.

•

Pulp: Halifax Paper Co. will expand its pulp mill facilities at Roanoke Rapids, N.C., within several months. The new unit, estimated to cost $1,750,000, will increase capacity from 740 tons to 800 tons/day, and permit simultaneous pulping of hardwood and pine. Rust Engineering Co. (Pittsburgh) has received the construction contract, will build two digesters, pulp washer, lime kiln, other auxiliary equipment.

FOREIGN

Aluminum/Japan: Japan's aluminum industry expects to increase its production capacity five-fold to 527,000 tons/year by '70. Mitsubishi, which had been a producer before World War II, is planning to re-enter the industry, now composed of Japan Light Metals, Showa Denko and Sumitomo Chemical.

•

Maleic/Germany: Rheinpreussen AG. (Homberg) plans to build at Meerbeck a maleic anhydride plant using Scientific Design Co.'s (New York) fixed-bed process, involving catalytic air oxidation of benzene. SD will provide design and engineering services and assist in training and startup. Initial capacity: 13.2 million lbs./year.

•

Petrochemicals/Britain: British Hydrocarbon Chemicals—jointly owned by British Petroleum Co. and Distillers Co. Ltd.—is planning to build a $28-million petrochemical plant near BP's Llandarcry refinery near Swansea. The company has not specified the chemicals to be produced.

•

Catalysts/Germany: Houdry Process Corp. (Philadelphia) and Chemische Werke Huels (Marl, West Germany) are organizing Katalysatorenwerke Houdry-Huels GmbH. (Marl) as a 50-50-owned subsidiary to produce and sell both parent companies' lines of catalysts.

•

Acrylonitrile/Japan: Asahi Chemical Industry Co. (Tokyo) says it will use Standard Oil of Ohio's one-step process, rather than its own two-step process, in the acrylonitrile plant to be built in Kawasaki by next May (*CW, Oct. 1, p. 26*). Asahi engineers are in the U.S. now studying the Sohio process.

•

Pharmaceuticals/Mexico, Peru: Merck Sharp & Dohme International Division of Merck & Co. (Rahway, N.J.) has budgeted $1 million for a new plant to replace present facilities in Mexico City and $350,000 for a plant to begin production of Merck products in Lima, Peru.

Naugatuck's Mucci pinpoints bright spots in hard-sell year ahead.

Harder Sell: Outlook for '61

Chemical sales management is preparing for a moderately tough selling year in '61. Except in a few cases, there's little chance for volume increases; and profits, even with steady sales, will likely fall. That's the gist of a just-completed Chemical Week survey of major U.S. chemical producers. This combined volume-and-profit-margin decline won't mean harsh cutbacks of personnel or other drastic measures.

It does point to hard-sell on product lines with best profit prospects, and re-emphasized efforts to trim selling costs.

Sales departments so far haven't found a common approach to a solution. Harshaw, for example, is holding to its present sales line, is restricting new hirings to replacement personnel only. McKesson & Robbins, on the other hand, is pushing sales of high-profit products, part of a plan used in some circles to concentrate on major customers, passing by marginal accounts.

One other manufacturer's broadly generalized plan: "Our main plan is to try to sell more, by calling on more customers, working more closely with them, and exploring new fields and adding new lines. The main thing is to have better materials and better inventory control—have what the customer wants when he wants it."

New Hope: New product sales are expected to offset volume drops in basics, say many forecasters. Synthetic latex developments, for example, hold high hopes in Goodyear's '61 picture. Greater diversification in uses for olefins will yield corresponding sales and profits increases, says Petro-Tex Chemical Corp. Jefferson Chemical expects a 5-7% increase in consumption of ethylene and propylene derivatives, tying this to a 5% over-all sales volume increase. A major polyethylene producer sees hopes for its high-density PE in the detergent bottle business, despite overcapacity in the field.

By concentrating sales efforts on new products with high volume and high profit futures, Allied Chemical reflects an industry-wide attitude. Allied is counting on isocyanates, linear PE, melamine and urea plastics to offset volume decreases in other materials, though the over-all rise will be somewhat less than the 5-8% hoped for earlier.

Industry spokesmen have further outlined chemical sales prospects for '61, describing in detail areas of expected growth and possibilities of slight lags. U.S. Rubber Co.'s Naugatuck Chemical Division general manager, Raymond Mucci, last week previewed commodity consumption before the American Management Assn.'s sales forecasting forum. With room for individual product fluctuation, he predicts, a better year lies ahead for rubber, textiles, chemicals and plastics. On a decline are metals, some for the third straight year, though all are still at relatively high levels. Some observers expect a slackening in the first half of the year, but most agree with Mucci's picture of an over-all gain. Major improvements are not expected until late spring of '61, followed by climbs to new highs by December. Harshaw, for example, blames politics for part of the expected early '61 slack.

Although many companies don't care to be specific, the political uncertainty at this stage hampers some sales managers' "feel" for sales prospects.

Sales Builders? Expansion and research budgets will not be hurting in economy efforts projected for next year. This means new products and more basics coming onstream, to help give salesmen ammunition. While funds for research won't change drastically, several producers will be stressing applied research and quality control more than before—anything to get an edge with new products and increased sales outlets for old ones.

This was Jefferson Chemical's idea: "We are emphasizing application research . . . next year to increase sales."

In any event, the limited sales prospects have kept a lid on big new expenditures. The expansions that are planned are largely continuations of operations successful in the past. On the West Coast, American Potash & Chemical is pouring millions into building up existing operations, as well as bringing a new manganese metal plant onstream. Its research budget, like that of neighbor U.S. Borax, will remain at about 3-4% of sales. Dow does not expect any personnel or fund cuts, but does not plan to expand pure research facilities.

Sales officials don't like to talk about expected slumps in their markets, but there's little hope for present sales levels in high-density polystyrene, phthalic anhydride, benzene, and metals such as copper, lead and

Mucci nominations for gains: rubber, textiles, chemicals and plastics.

zinc. But aluminum use will continue to rise, say most observers. One Midwestern producer feels a continuing slowdown in demand for its chemicals for oil-well drilling.

Reviewing the CPI outlook for next year, Allied Chemical's Marketing Vice-President I. H. Munro outlined and clarified the major causes behind the growing cost-price squeeze. Speaking before the National Industrial Conference Board recently, he analyzed the effects of excess production capacity, higher costs of labor, raw materials, and general operations, and stiffer competition, both foreign and domestic. The sales edge, he says, will go to the producer who can operate most efficiently.

Squeeze plays are in the sales picture for a long time to come, but chemical process industries companies are holding to original budgets and pushing commodities with good volume and profits. The major disappointment is that, although new production highs are ahead, the rate of growth is below the pattern of recent years.

Styrene monomer declines, for example, are keyed to leaner sales of replacement tires. Sales departments, therefore, are pushing diversification to relieve dependence on such narrow segments of the market. Example: plastics manufacturers' efforts to move into the packaging field, long dominated by paper products.

New Sales Boosters

CPI marketing men may be seeing a lot of two new marketing ideas: (1) sales discounts that are turned into investments; (2) industrial trading stamps.

In the former plan, discounts for prompt payment are invested in securities in the customer's name. The industrial trading stamp plan, now getting into gear in Chicago, is similar to consumer trading stamp schemes —stamps are awarded to buyers' firms according to the value of purchases.

Drug Discounts: The plan to invest discounts for prompt payments got its start recently at Philadelphia's Smith Kline & French, Inc., subsidiary of Smith, Kline & French Laboratories. Purpose: to encourage prompter bill payments, boost sales of the firm's wholesale drug products.

Here's how it works:

Druggist customers of SK&F who buy at least $1,500 worth of drugs from the firm each quarter will be eligible for the plan. If their payments are made within 10 days, the normal 2% cash discount may be taken in the form of mutual fund stock (either Wellington Fund, or Wellington Equity Fund) simply by notifying a Philadelphia brokerage firm (Smith, Barney & Co.). SK&F actually sends the money to its bank, which does the stock buying in the customers' names.

Getting Results: SK&F says that the discount investment plan has already done some good in improving bill payment lag. Moreover, the company figures it will increase sales as smaller purchasers boost their orders to qualify and larger buyers shift orders to SK&F to cash in on the stock. For these reasons, it's quite likely that the plan will more than pay for itself, offsetting the 8% brokerage fee that SK&F accepts under the plan.

SK&F has for some time been counting on the plan to cut receivables, boost sales—it first had to win Securities & Exchange Commission approval. Now that it has approval, and a successful project is under way, it's a good bet that other marketing men will soon adopt similar plans. Already, other Philadelphia drug distributors are setting up drug discount schemes that do the same job.

CPI Green Stamps? The other new idea in CPI marketing—use of industrial trading stamps—is probably more of an innovation, yet seems to have less chance of gaining wide acceptance.

A Chicago firm, The Industrial Trading Stamp Co., has introduced trading stamps into the industrial market for the first time. Ralph Handleman, chief of the new firm, decided to set up a scheme whereby purchasers of steel products would receive stamps on the basis of quantity of material bought. Handleman is reportedly now seeking chemical distributors for his plan, but has run into a storm of protest over the propriety of his scheme.

Purchasing agents have labeled the plan "just another form of payola"; many have shunned the idea. But Handleman is still soliciting chemical distributor support.

Another Hula Hoop?

If plans of Wibbler Co. (St. Louis) and its sole supplier, Monsanto Chemical Co., work out, CPI marketers may hear a lot about a new gadget that evokes hopeful memories of the fabled hula hoop plastics boom.

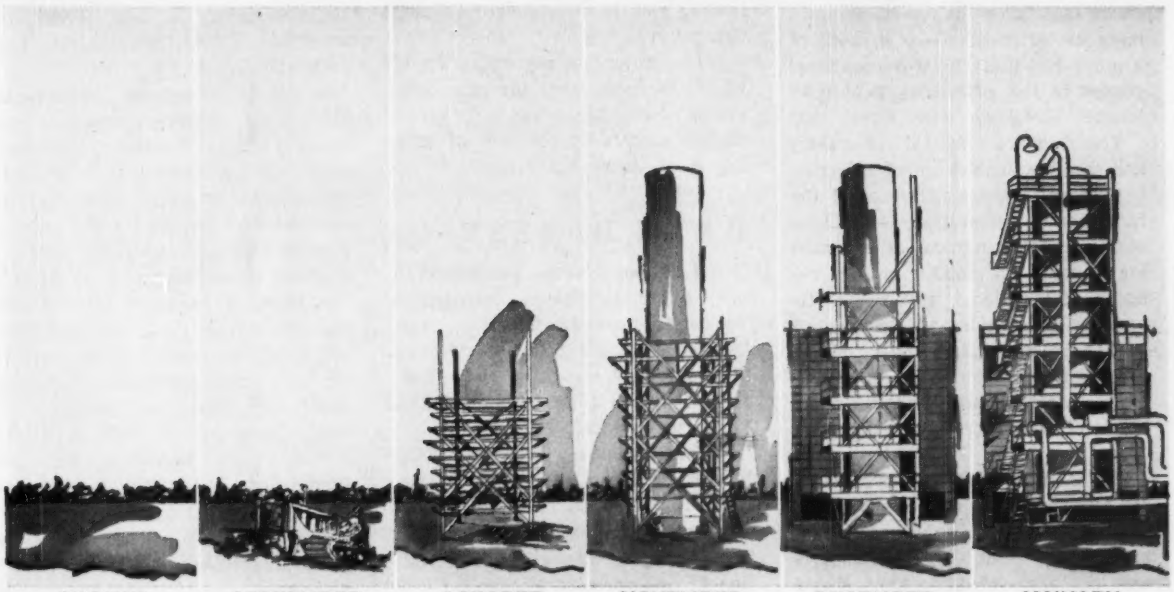
The "wibbler" is a small, polystyrene toy, shaped like a miniature arched bridge, with a step on each side, similar to the once-popular teeter board. Wibblers are popular with children for wobbling, wiggling and "wibbling" all about their neighborhoods.

The new toy is just about to kick off sales in Los Angeles, Chicago and San Francisco. During the last few weeks, it began selling at a rapid rate in New York and Philadelphia after a fast start in St. Louis. First-week sales reportedly topped 1,300 dozen wibblers—some 15,600 of the 8-oz. plastic toys, and 7,800 lbs. of Monsanto's Lustrex 88 high-impact polystyrene. Price: $1.98.

Wibbler Co. and Monsanto are hoping the toy will catch on in the fashion of the hula hoop *(CW, Oct. 11, '58, p. 117)*, which swept the nation in mid-'58, or last year's Dr. Seuss zoo toys *(CW, Sept. 26, '59, p. 42)*, both of which were of high-density polyethylene.

Of course similar ventures have been tried with little success since then, and it's still anybody's guess how successful the wibbler may be.

CHEMICO BUILDS NITRIC ACID PLANT IN SIX MONTHS



It took just six months for Chemico to successfully complete a 120 ton per day nitric acid plant in Lawrence, Kansas. Until the client gave his final "go-ahead," not an hour of drafting or engineering had been done on the project—not a single piece of equipment had been placed on order. Yet, six months from that date, the plant finished its acceptance test run, producing at above rated capacity.

With 34 nitric acid plants in operation all over the world, and three more in the design stages at this very time, Chemico maintains its position of leadership in this field. In building plants to produce Ammonia, Urea, Nitric Acid, Acetylene, Methanol, Hydrogen, Sulfuric Acid and other chemical and petrochemical products, Chemico is setting new standards for the entire engineering industry.

This six month performance for a nitric acid plant follows closely the recent successful completion of an ammonia plant in ten months. It is not just the time factor alone which sets Chemico plants apart, however. Chemico clients know that they are buying efficient, economical, proven processes which assure ease of start-up and simple, safe operation. If you are considering building a new plant or enlarging present process facilities, let Chemico help you get the most for the capital you invest. Write for the General Bulletin which describes the wide range of Chemico's activities.

CHEMICO
CHEMICAL CONSTRUCTION CORPORATION
525 West 43rd Street, New York 36, New York

CHICAGO • DALLAS • HOUSTON • PORTLAND, ORE. • TORONTO • LONDON • PARIS • JOHANNESBURG • TOKYO

Keeping Tabs on Taste

Questionable advertising will get closer inspection—and perhaps much more useful criticism—as a result of a move last week by two prominent groups in the advertising field (CW Market Newsletter, Oct. 8).

The Assn. of National Advertisers and the American Assn. of Advertising Agencies last week revealed the formation of a joint group—the Committee for Improvement of Advertising Content—to monitor taste in national and regional advertising. Its purpose: to consider ad agencies' or advertisers' complaints and criticisms of advertising material and to recommend corrective action to the agencies and advertisers that placed the ads.

The 22-man committee consists of 10 representatives each from ANA and 4A, plus a cochairman from each group. Four CPI ad managers are on the ANA group: David Beard, Reynolds Metals Co.'s general director of advertising; James Burke, Johnson & Johnson's advertising chief; Samuel Thurm of Lever Brothers; and Douglas Smith, advertising and merchandising director for S. C. Johnson & Co., Inc.

How It Works: The committee will handle complaints through a mechanism they call "the interchange of opinion." Criticisms and complaints will be accepted by the committee at its New York office (420 Lexington Ave., New York 17), will then be considered by the group. If the committee upholds the criticism, it will be forwarded to the agency or advertiser concerned, along with the committee's comments.

In cases deemed "serious," the joint committee will expect a reply explaining what corrective action planned. Throughout this process, the committee will not divulge the names of anyone submitting complaints.

The move expands a program that has been carried on successfully since '46 by 4A but pertaining only to agency work, not to advertisers. Initally 4A merely passed all criticisms along to the placing agencies. Then, in '54, 4A began evaluating incoming complaints and passing their comments, as well as their suggestions, to the agencies.

Since '54, 4A has received 260 criticisms, has found 151 of them—some 58%—to be objectionable. Of these, 88 violated principles of good taste, 44 were considered "manifestly misleading and 19 were judged unfairly derogatory.

If this record is any indication of what's to come from the new committee, companies can look for a sharply stepped-up program of scrutiny of all their advertising.

DATA DIGEST

• **Low-Temperature Insulation:** A new folder (IN-307A) describes a low-density insulating fill for use with low-temperature liquefied gases. Data lists physical properties and costs. Johns-Manville Corp. (22 East 40th St., New York 16).

• **Diisocyanates:** A nontechnical booklet reviews the diisocyanates, their history, chemistry and uses. Among them: foamed resins, coatings, adhesives, fibers. National Aniline Division, Allied Chemical Corp. (40 Rector St., New York 6).

• **Cobalt Alloys:** Two new publications describe cobalt-base and nickel-base superalloys, their physical and mechanical properties, corrosion resistance, fabrication and applications. Also studied are thermal shock and fatigue of cobalt alloys and cermets. Cobalt Information Center, c/o Battelle Memorial Institute (505 Kings Ave., Columbus 1, O.), and Centre d'Information du Cobalt (35, rue des Colonies, Brussels, Belgium).

• **Graphite Anodes:** Data sheets list typical chemical and physical properties of graphite anodes and surface finishing obtainable in various machining operations. Electrode Division, Great Lakes Carbon Corp. (18 East 48th St., New York 17).

• **Organic Chlorine Compounds:** New booklet describes 13 chlorinated organics—e.g., butyl chloride, epichlorhydrin, used as intermediates and special-purpose compounds. Data include physical and toxicological properties, handling information, literature references. Union Carbide Chemicals Co. (270 Park Ave., New York 17).

• **Polyurethane:** Technical service bulletin (TS 6071) describes dispersion characteristics, stability, formulation and production procedure of polyurethane used in developing flat or satin varnishes. Spencer Kellogg and Sons, Inc. (Buffalo 5, N.Y.).

• **Alkali-Soluble Resin:** Technical bulletin describes properties and uses of new alkali-soluble resin suitable for use in acrylic and polystryene emulsions. Reichhold Chemicals, Inc. (White Plains, N.Y.).

• **Alkyl Phosphate Surfactants:** Data sheet outlines properties, uses and availability of series of polyphosphate ester surfactants. Concentrates are available as readily soluble syrupy acidic esters at 98-100% activity. Beacon Chemical Industries, Inc. (33 Richdale Ave., Cambridge 40, Mass.).

• **Corn in Industry:** Revised edition of 64-page book discusses various industrial uses of corn—e.g., in alcoholic beverages, industrial alcohol, starch, sugar, corn oil—and the processes from which these products stream. Corn Industries Research Foundation, Inc. (1001 Connecticut Ave. N.W., Washington 6, D.C.).

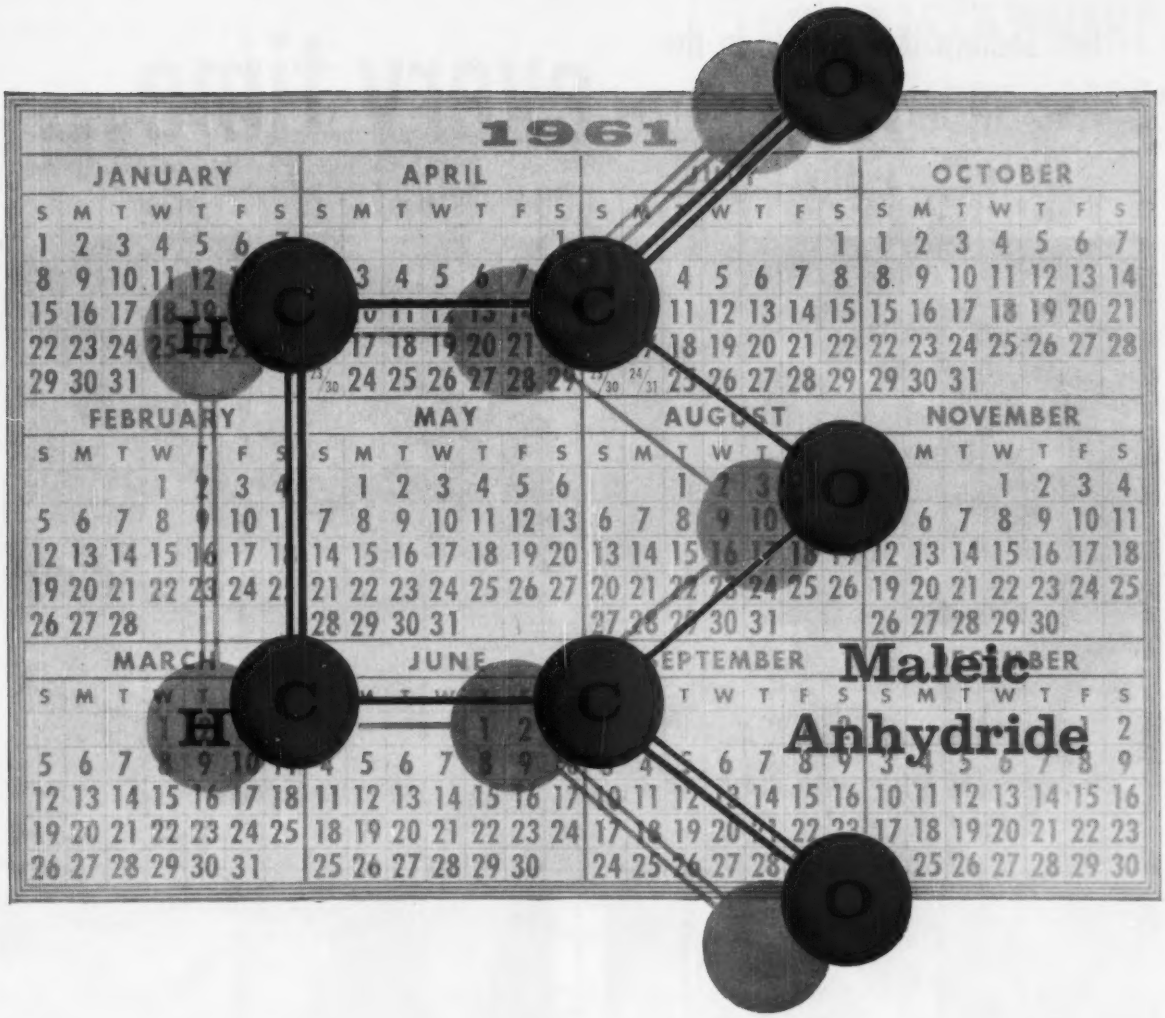
• **Latexes:** Brochure describes properties and uses of Dow's family of latexes. Among them: styrene-butadiene, polystyrene, vinyltoluene-butadiene, vinyl, saran, acrylic and experimental types. Properties covered: monomer ratio, specific gravity, percent solids, initial pH, particle size and stabilizer. Plastics Sales Dept., Dow Chemical Co. (Midland, Mich.).

• **Commercial Glass Materials:** New, 16-page booklet (B-83) details properties of 32 commercial grades of glass—e.g., mechanical, thermal, electrical, optical, heat transmission, corrosion resistance and viscosity. Corning Glass Works (Corning, N.Y.).

• **Bulk Handling Systems:** New, 32-page booklet outlines methods of using large metal Tote Bins for handling various chemical materials, both in plant and in transit. Subjects covered: filling, storing, discharging, transporting the bins, automated discharge plans, and estimating costs using the bins. Tote System, Inc. (Beatrice, Neb.).

• **Intermediates:** New bulletin (No. 347) outlines properties and uses of 13 chemical intermediates offered commercially. Chemical Marketing Division, Abbott Laboratories (North Chicago, Ill.).

• **Polysulfide Rubber:** Folder describes cold-setting, flexible-mold compounds based on polysulfide rubber, covers properties, performance and methods of use. Smooth-On Manufacturing Co. (572 Communipaw Ave., Jersey City 4, N.J.).



Best way to solve your 1961 MALEIC problems:

Call Pittsburgh Chemical now!

Right *now* is the time to make sure you have dependable supplies of uniform-purity maleic anhydride in 1961. And the best way to do that is to call *Pittsburgh Chemical* today.

To keep pace with the constantly growing demand for Pittsburgh maleic anhydride, our new twenty million pounds/year maleic plant will go into production early in 1961. This modern, fully-integrated plant will permit complete quality control—from coal to finished maleic.

The advantages to *you*?

(1) A uniform, virtually dust-free product that will help you maintain maximum ease-of-handling and efficient, trouble-free processing.

(2) Assurance of reliable, on-schedule deliveries from a *basic* source.

(3) Available in cost-saving mixed carload lots with Pittsburgh fumaric acid and/or phthalic anhydride.

(4) Backed by alert, responsive technical service, in your plant when necessary.

Pittsburgh Chemical does *not* make resins . . . only the high-purity intermediates used to produce them. So for reliable supplies of maleic anhydride, next week or next year, call your nearest Pittsburgh Chemical regional sales office *today*.

INDUSTRIAL CHEMICALS DIVISION

PITTSBURGH CHEMICAL CO.

GRANT BUILDING PITTSBURGH 19, PA.

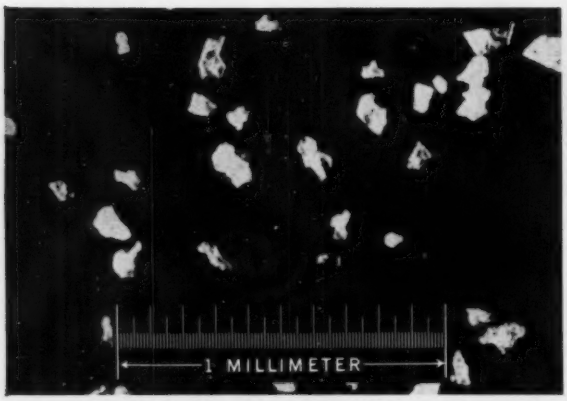
A Subsidiary of PITTSBURGH COKE & CHEMICAL CO.

1448

Regional Sales Offices: Pittsburgh • New York • Nashville • Chicago • Houston • Los Angeles • San Francisco

Get Sodium Bicarbonate in the grain size you need every time...

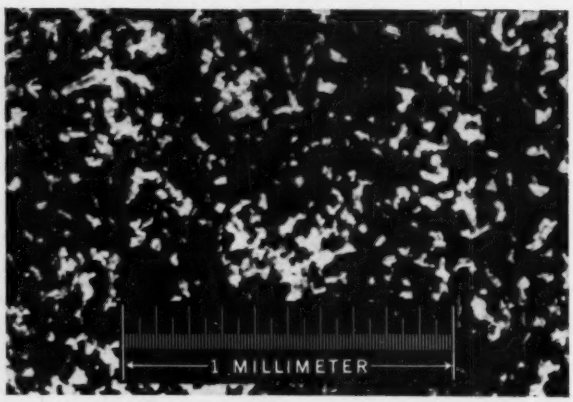
FROM CHURCH & DWIGHT



Sodium Bicarbonate U.S.P. Powdered No. 1—For general purpose use in chemical processing, dyestuffs, adhesives, starches, textiles and industrial applications.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

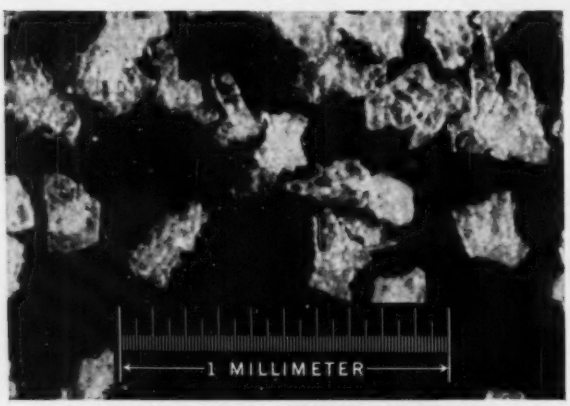
42 Mesh.....Trace	200 Mesh.....35.0%
100 Mesh.....5%	325 Mesh.....70.0%
170 Mesh.....20.0%	400 Mesh.....80.0%



Sodium Bicarbonate U.S.P. Fine Powdered No. 3DF for use specifically in dry powder fire extinguisher mixes, also in rubber and plastics blowing, lubricant for sheet vinyl.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

170 Mesh.....Trace	325 Mesh.....25.0%
200 Mesh.....2.0%	400 Mesh.....45.0%



Sodium Bicarbonate U.S.P. Granular No. 5 for use in effervescent salts, other pharmaceuticals and special types of cleansers.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

42 Mesh.....Trace	100 Mesh.....92.5%
65 Mesh.....27.0%	170 Mesh.....99.0%
80 Mesh.....66.5%	

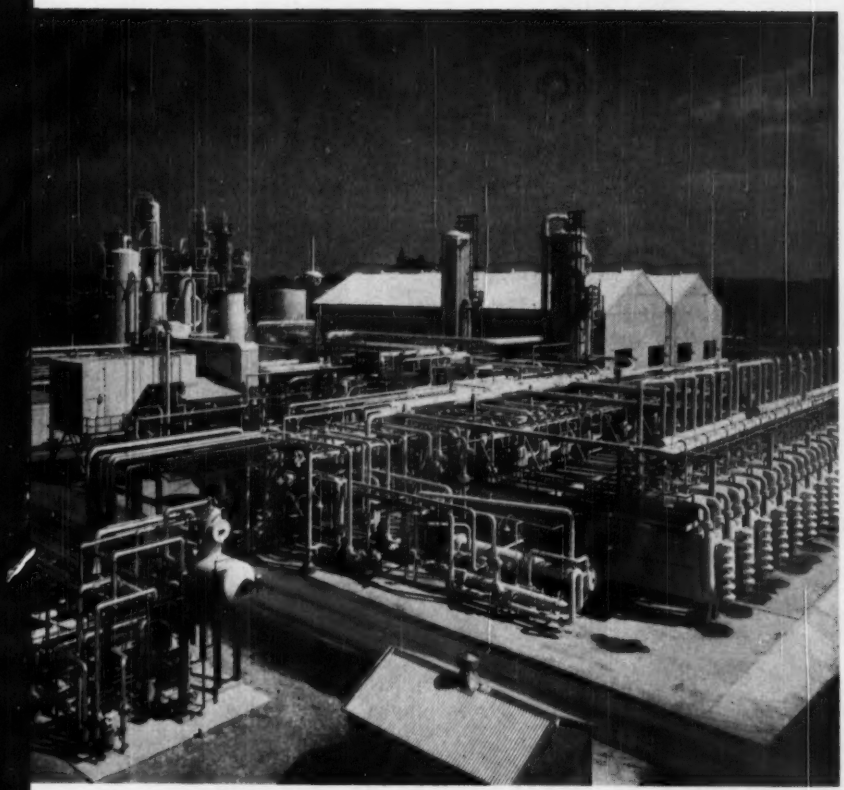
Sodium Bicarbonate U.S.P. Treated Free-Flowing for use in fire extinguishers and sponge rubber.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

42 Mesh.....Trace	200 Mesh.....35.0%
100 Mesh.....5%	325 Mesh.....70.0%
170 Mesh.....20.0%	400 Mesh.....80.0%

Are you getting sodium bicarbonate of the specific grain size for optimum results in your process or for maximum shelf life and performance of your products? You can eliminate doubts by specifying Church & Dwight. This simple step will assure you of obtaining the widest selection of grain sizes available because Church & Dwight is the country's largest supplier of Sodium Bicarbonate U.S.P. You'll also receive for the asking unmatched technical service based on more than 100 years of experience with sodium bicarbonate. Unusual grain size requirements are given special attention. Try us and see.

CHURCH & DWIGHT CO., INC., 70 PINE STREET, NEW YORK 5, N. Y.



New, $7-million dewaxing operation at Tulsa refinery is onstream.

New Power in Wax Picture

DX Sunray Oil Co. (Tulsa, Okla.) has just put onstream a $7-million dewaxing plant. The company figures it is now the world's third-largest producer of petroleum waxes, after Standard Oil of New Jersey and Atlantic Refining.

The new plant is expected to produce over 100 million lbs./year of paraffin and microcrystalline waxes. Although DX Sunray has long been a major manufacturer of paraffin waxes, it will be turning out microcrystalline waxes for the first time. Its new installation will enable the company to nearly double its total wax capacity.

The plant—one of several multimillion-dollar projects that DX Sunray either has recently completed or has under construction at its Tulsa refinery — replaces three separate and smaller dewaxing facilities. It covers an area of 230 by 310 ft., has a total work force of 18 persons.

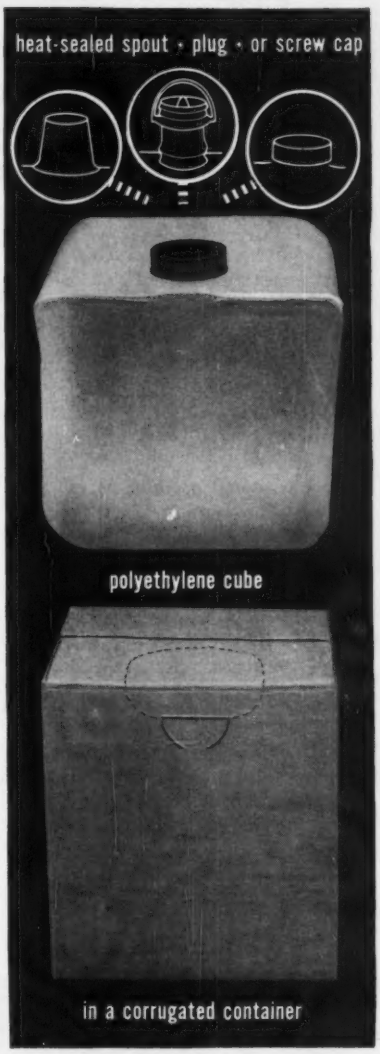
Modern Unit: Basic function of the plant will be to remove wax from oil, then fully refine the wax. The unit can produce eight grades of petroleum waxes, ranging from a light paraffin to a high-melting microcrystalline wax. With its previous facilities now abandoned Sunray was restricted to producing a crude microcrystalline wax and a limited amount of fully refined and semirefined paraffin waxes.

Material entering the plant to be processed includes five different streams. Four are fractions from the plant's crude unit; the fifth comes from its propane deasphalting unit. After the wax has been removed, these oil streams form the base stock for five different grades of lubricating oils, which are sent to other units in the plant for further refining. Each stream is processed differently and at separate times.

The plant, reported to be the second-

SHIP LESS WEIGHT
SAVE MORE SPACE
with the 1-gallon
CUBITAINER®

- Lightweight, space-saving cubes
- Low cost
- Single trip
- Simplified handling
- For regulated commodities
- Standard filling



Write today for full information

HEDWIN®
HEDWIN CORPORATION
New York 17, New York • Baltimore 11, Maryland

largest MEK solvent dewaxing facility, is equipped with 12 of the largest rotary filters designed for dewaxing, and a 7,500-horsepower turbine, which powers two compressors that supply refrigeration used in the process.

The facility incorporates several types of equipment not used in the general refinery—e.g., double pipe exchangers, dewaxing filters.

The turbine-powered compressors chill the oil-wax combination to below-zero temperatures, solidifying the wax. (More than 2,000 tons of refrigeration are required.) The stream then goes to the drum-type filters, where a solvent—methyl, ethyl, ketone and toluene—separates the wax from the oil. The oil and solvent mix while the wax filters out. In a final step the oil stream goes to recovery towers, where the solvent is extracted from the oil.

Specialties Material: Sunray's waxes find their way into many specialties items: cosmetics, fireworks, inks, paints, paper, rust preventives, carbon papers, detergents, floor polishes, textiles, food containers, and glass fibers.

Much of Sunray's waxes for export go to Central and South American countries for lighting, and religious ceremonies.

An estimated 768,000 tons of petroleum wax will be produced in the U.S. in '60. About 40% of production is used in coating milk cartons, and 22% in making candles. Paper manufacturers are big-volume customers, use waxes for coating a wide variety of packages.

Over-all, U.S. demand for wax is expected to increase about 25% by '68, compared with an 83% jump in the past decade. The short-range forecast is for supply and demand to stay pretty well in balance.

One balancing factor: plastics—mainly polyolefin resins—have been eating into the wax market. Polyethylene sheet coating has increasingly replaced wax coatings on milk cartons, and the future of waxed paper is clouded by more demand for wrap materials such as cellophane, aluminum and polyethylene. Partly offsetting the decline in use of waxed paper for package wrapping is some gain in use of wax for frozen food containers.

Another factor: U. S. exports are expected to decline as foreign countries step up their own wax production.

Aceto's Mann and Frankel: Eyeing more home-grown products.

Resellers in a New Role

While most U.S. companies are stepping up their activities abroad, Aceto Chemical (Flushing, N.Y.) is busily trying to bring its sales of U.S.-made chemicals up to the level of imported products. The company, which acts as exclusive U.S. sales agent for a dozen overseas chemical companies, will continue to try to build its business abroad. But the Common Market is thinning the ranks of foreign firms that need sales agents in the U.S.

The function of the chemical import house has always been a varying one. Such companies have nothing to make or license abroad. Their business can be substantial—but keeping it growing or even at a high level requires plenty of flexibility. And Aceto's latest twist illustrates the current tack such companies must take.

In general, Aceto, which has sales of around $2 million yearly, can be described as a supplier of hard-to-find chemicals that are used in small quantities, such as intermediates for the cosmetic, pharmaceutical and rubber industries. The firm's product list includes over 600 items, some 400 of which might be called active stock; the other 200 items are still waiting for customers.

Look Homeward Angle: Aceto explains its turn toward U.S. suppliers as necessary because company President Seymour Mann feels European trade blocs will force many small European chemical companies to merge to survive. And many of Aceto's current suppliers will be swallowed up in companies that have their own sales setups. The holes left in its products list, due to such moves, Aceto hopes to fill with U.S.-made products.

The company is also looking toward a more active role as a producer of chemicals. It is already producing some—agricultural chemicals and intermediates acetonyl acetone and trimethylene glycol—at the Nitro, W. Va., plant of Roberts Chemical, an outfit in which Aceto has financial interest.

Aceto hopes to tie up soon with a company that is long on research but short on sales, to complement its own

Do you know how many of your alcohol needs can be filled by

Low cost methanol?

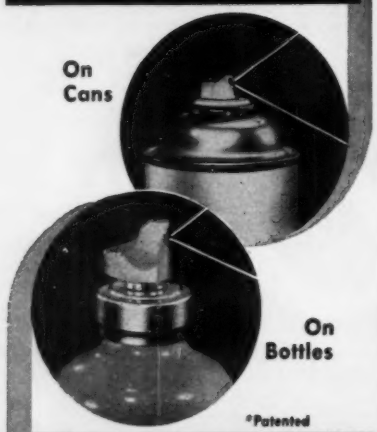
It's only common sense to look at *all* raw material costs—alcohol costs, for example. Here is where lower price methanol may be able to deliver real savings over the alcohol you're now using.

How much can methanol help to reduce manufacturing and processing costs? Plenty, when you consider that the total market for the big 3 alcohols is in excess of 4 billion lbs. annually. Methanol, the lowest cost of the three, often can offer definite advantages when used in place of isopropanol in automotive chemicals, laminates, pharmaceutical extractions, metal cleaning and petroleum processing . . . and in place of ethanol in petroleum processing, as a dye solvent, and in film manufacture. What's your share of these potential savings? Write for Product Bulletin S-03-6, or check with your Celanese representative or distributor. They can give you money-saving facts about Celanese Methanol, and answer your specific questions. Celanese Chemical Company, a Division of Celanese Corporation of America, Dept. 652-J, 180 Madison Avenue, New York 16. Celanese®

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., N. Y. 16

Celanese CHEMICALS

8 Reasons Why
RISDON
MICRO-MIST* VALVES
Make New Aerosol Products Possible



*Patented

1. COMBINES THE DESIGN ADVANTAGES OF THE RISDON VALVE WITH THE FIRST AND FOREMOST MECHANICAL ATOMIZING ACTUATOR.
2. WIDE RANGE OF APPLICATION — Dispenses all 3-phase products including water-base formulations. Dispenses propellant emulsions or dispersions. Gives Super-spray performance on 2-phase and ultra-low pressure products. Applied to Glass, Metal and Plastic Containers.
3. WIDER CONE, FINER, DRIER SPRAY CLOUD — Softer, more evenly diffused spray.
4. LONGER LASTING CONTENTS — Especially advantageous in medicinals and perfumes.
5. SPRAY CONE CLEARS CONTAINER.
6. IMPROVES PRODUCTS BY MINIMIZING DILUTION EFFECTS—MICRO-MIST valve on two-phase products give dual-action atomization which permits reduction in propellant.
7. GREATER FORMULATION LATITUDE AND ECONOMY—MICRO-MIST'S double diffusion effect facilitates greater formula variations in quantity and type of propellant.
8. IMPROVED, ULTRA-LOW PRESSURE APPLICATIONS — Better performance over wider range of temperature and pressure.

Write for free RISDON Valve Booklets

THE RISDON MANUFACTURING CO.
Valve Division
Naugatuck, Conn.

SI-111

heavy sales, weak research, status. In the role of reseller, Aceto, because of small profit margins, hasn't been able to provide the minimum of $100,000 yearly it feels it should have for research.

Some of the areas that Aceto aims to explore in its growing role as chemicals producer is the production of plastics and specialty vinyl monomers that are beginning to find use in organic semiconductors. These materials, which run in the range of $30-50/lb., can replace materials—such as gallium compounds—that carry tags of $500-1,000/lb. In the industrial field the company is now producing such monomers as chlormaleic anhydride and allyl cyanide.

Reed in the Wind: In shifting the direction of the company's main efforts Aceto puts another curve in the zigzag course it has followed since its beginning in '45. Started as a producer of small-volume items used in the cosmetic field, the company has progressively been an exporter of by-product-grade chemicals produced in the U.S., a seller and upgrader of these same chemicals in the U.S., a sales agent for European-produced chemicals in the U.S. Now, of course, it is a limited producer of chemicals hoping to broaden its manufacturing role.

Brooklyn Beginnings: The company set up operations when two young chemical engineers Seymour Mann, now Aceto's president, and Arnold J. Frankel, general manager, decided to produce aceto derivatives (hence the company name) for the perfume industry. Each invested $1,000 in the partnership. Their plant went onstream in a Brooklyn store. A six months' sales total of $200 sent the partners looking for jobs. Mann did some contract research; Frankel got a job with a plastics company.

New Role—Reseller: In '46 Mann was asked about possible sources of aniline. His admittedly naive reply: "I'll call Du Pont." Du Pont's answer to his phoned query convinced him spot buyers could not expect immediate delivery. He then remembered that aniline is a by-product of vanillin manufacture. A quick check with some local vanillin producers turned up one: Maywood Chemical, that had a carload of aniline available —but it was not pure enough for dye purposes Mann had in mind.

Setting aside his original objective, Mann went to chemical literature, found that the impure aniline was used as a rubber accelerator. He bought Maywood's supply, sold it for export and made $1,000 in an afternoon.

This sent him scouting around for other crudes that might be used this way, and Aceto was reborn as a chemical reseller. Materials that needed some upgrading before resale were farmed out to Truland Chemical (then in Union, N.J.).

Besides refining offgrade materials the company also did some elementary manufacturing. By-product acetic acid, for instance, was mixed with fusel oil to make amyl acetate.

European Plan: By '48 much of the business of reclaiming by-products began to slacken as chemical companies began to recover their own materials. With its U.S. sources drying up, Mann and Frankel went abroad and contacted every company it could. England, then in its "export or die" period, proved the most fruitful, and Aceto began its phase as sales agent for overseas companies. Marchon Products Ltd. (Whitehaven, England) was the first company Aceto represented (for higher alcohols and sulfates).

Following that, Aceto became U.S. sales agent for the dye intermediates and solvents made by the Chemical Division of Distiller's Ltd. (London). Leda Chemicals (London, England) gave Aceto a foreign source of alkyl halides, quaternary ammonium compounds, and fatty acids and related small-tonnage sulfur compounds. In Germany, Aceto's first tie-up was with Hoesch (Duren, Germany), a supplier of metallic salts and plastic stabilizers. Aagrunol (The Netherlands) is Aceto's agricultural and rubber chemicals source.

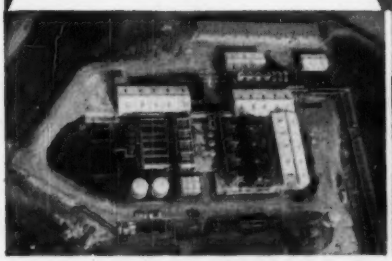
Returning Home: In '58 Aceto acquired an interest in Roberts Chemical. It became area representative for Roberts, did some of the market research to suggest new products, and developed Roberts as a source of chemicals to round out its line.

While its maneuvers have been profitable, Aceto found that as a reseller of chemicals, its growth pace was limited to that of its principals. This is one situation the company hopes to change by making its own products. It seeks to increase the per-

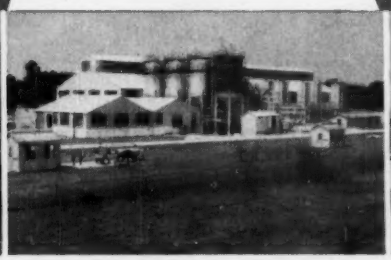
SULPHUR

6 POINTS OF DEPARTURE

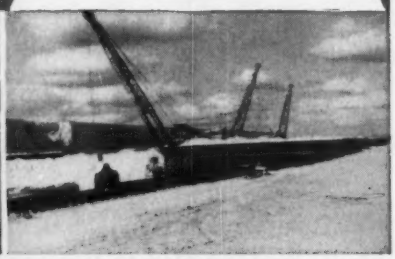
FANNETT, TEXAS



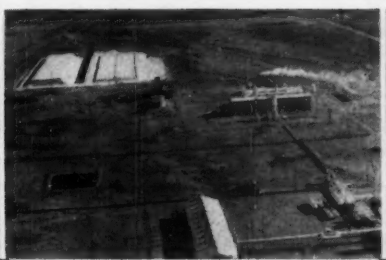
MOSS BLUFF, TEXAS



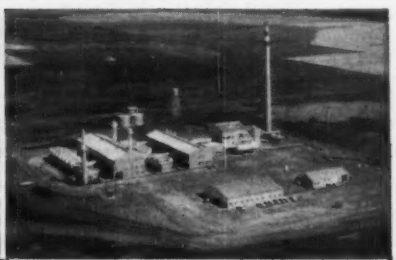
NEWGULF, TEXAS



SPINDLETOP, TEXAS



WORLAND, WYOMING



OKOTOKS, ALBERTA

Solid or Molten Sulphur to all users in the United States and Canada

In addition to these six producing properties, stocking and distribution centers are being set up, thus broadening the TGS Service to industry. Ample supplies of both molten and solid sulphur will be available at these centers. Cincinnati, the first of these units, is now in full operation.

TEXAS GULF SULPHUR COMPANY

75 East 45th St., New York 17, N. Y.
811 Rusk Ave., Houston 2, Texas

Sulphur Producing Units: Newgulf, Texas • Spindletop, Texas • Moss Bluff, Texas • Fannett, Texas • Worland, Wyoming • Okotoks, Alberta, Canada

Puzzled

over a pigment problem? an extender problem? a magnetic powder problem? let Williams assist you in solving it!

In all modesty, let us say that we are the largest manufacturer of our kind in the world. We make colors and pigments of the inorganic type—natural and synthetic—the naturals by processing selected ores and minerals, the synthetics by such chemical processes as precipitation and calcination.

Williams customer research and development facilities are the finest, so when you're puzzled over a problem using pigments, extenders, magnetic powders . . . let us know. We'll be glad to put our organization to work for you. Write, stating your problem . . . to Department 39, C. K. Williams & Co., 640 N. 13th St., Easton, Pennsylvania.

Williams...the world's broadest line of its kind!

BLACKS
Pure Black Iron Oxide
Lampblack

BROWNS
Pure Brown Iron Oxide
Metallic Brown
VanDyke Brown

GREENS
Pure Chromium Oxide
Pure Hydrated Chromium Oxide

REDS
Pure Red Iron Oxide
Red Iron Oxide
Venetian Red
Cuprous Oxide

NATURALS
Raw and Burnt Sienna
Raw and Burnt Umber

YELLOWS
Pure Yellow Iron Oxide
Ochers

EXTENDER PIGMENTS
Anhydrous Calcium Sulfate
Barytes
Calcium Carbonate, Precipitated
Silica
Whiting

MAGNETIC MATERIALS
Iron Powders
Magnetic Iron Oxide

ROUGES
Glass Polishing
Metal Polishing

WILLIAMS
COLORS AND PIGMENTS

"Pigment Technology at its best"

C. K. WILLIAMS & CO., E. ST. LOUIS, ILL. · EASTON, PA. · EMERYVILLE, CAL.

centage of domestic materials on its sales list to 50% of their over-all sales dollar (it's 25% now).

And when they have cast off the restrictions imposed by being a reseller, Mann and Frankel, who now own the business 50-50, see a quick route to sales in the $4-million range. When that day comes, the two believe their next phase—public ownership—will be their logical opportunity.

EXPANSION

Buys Cosmetic Company: Chesebrough-Pond's, Inc. (New York), has bought the worldwide interests of Northam Warren Corp. (Stamford, Conn.), maker of Cutex, Odorono and Peggy Sage products. C-P will operate Northam Warren as a separate division, continuing its present policies and personnel. Terms of sale were not disclosed.

•

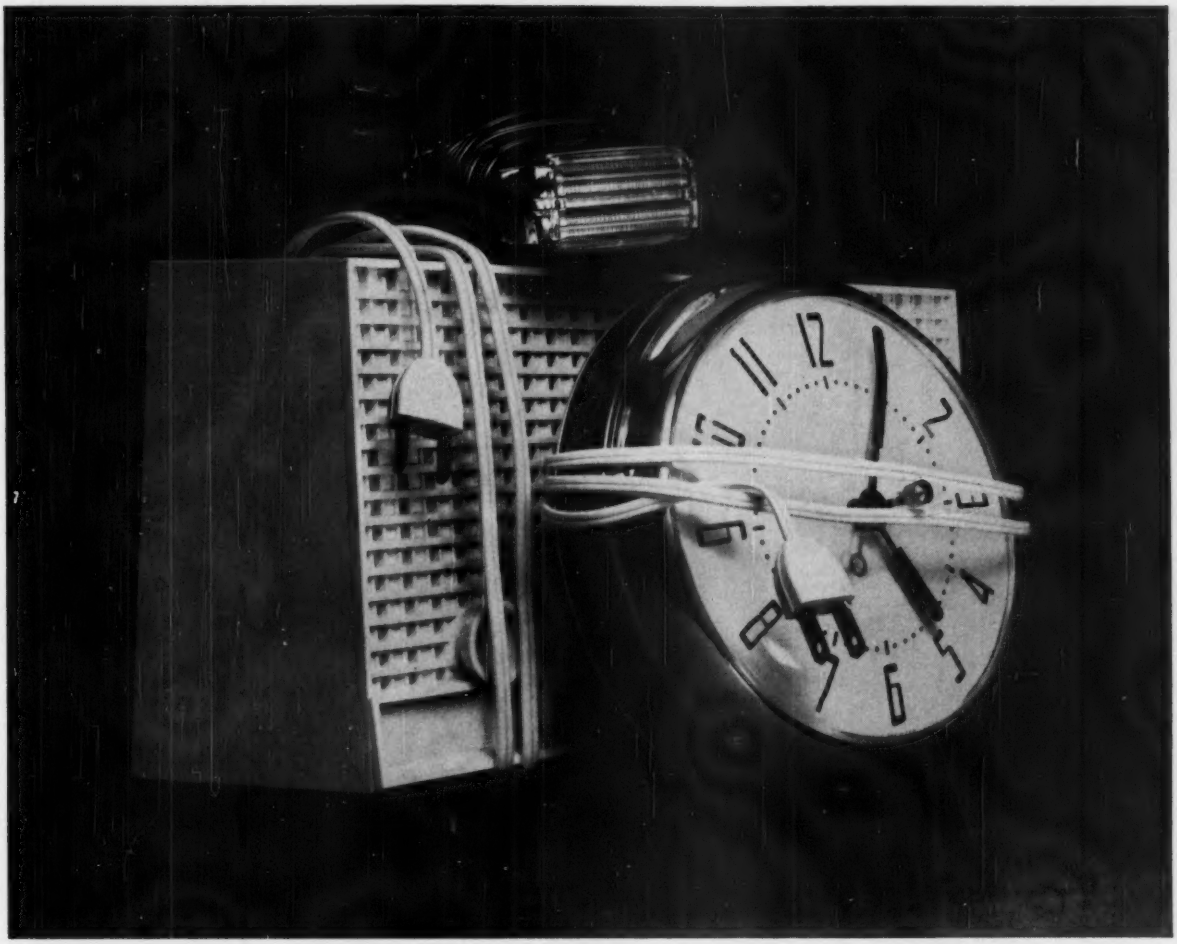
Licensee Added: H. I. Thompson Fiber Glass Co. (Los Angeles) has licensed Haveg Industries, Inc. to use its patents on vitreous silica fiber. The material is used for nose cones, rocket nozzles, other missile industry items.

PRODUCTS

New Thickeners: Superior Materials, Inc. (New York), has made commercially available two organic thickeners for oil-based paints, coatings, mastics and inks. Superior Thickener No. 912, a liquid bodying agent, may be added at any point of the manufacturing process to increase viscosity. Superior Organic Thickener No. 9916, a powder that's added during mixing, increases viscosity and is designed to give a multipurpose gel structure that corrects sag, prevents pigment settling.

•

Acid Additives: Keystone Plating Supply, Inc. (41839 Michigan Ave., Wayne, Mich.), has developed a pair of acid additives, tradenamed Hydronex No. 1 and No. 2, for electroplaters. The compounds are sulfur-free liquids, soluble in water and acid solutions. Hydronex 1 is suggested for use in hydrochloric acid solutions of all concentrations and temperatures; Hydronex 2, for use in solutions of sulfuric acid, sulfamic acid and hydrochloric acid.



Making vinyls safe for contact with polystyrene

Would it be safe to leave these polystyrene cases wrapped in *your* vinyl-insulated wire? Or must you warn your customers against the perils of plasticizer migration?

There's one plasticizer you don't have to worry about . . . Rohm & Haas PARAPLEX G-54. PARAPLEX G-54 *stays* in vinyls. It gives your compounds excellent resistance to plasticizer migration into polystyrene, enamels, and acrylic plastics. There's no marring of finishes, no crazing of plastics.

PARAPLEX G-54 has other advantages, too. In a vinyl compound, it promotes outstanding retention of physical properties on exposure to high temperatures, imparts good resilience, resists extraction by oils, greases and soapy water, has good compatibility at high-temperature, high-humidity service conditions.

For heat and light stabilization, PARAPLEX G-54 produces excellent results in combination with the epoxy plasticizer PARAPLEX G-62. If peak electrical performance in vinyl insulation is your goal, you should also evaluate MONOPLEX S-90E.

Get complete technical information by writing for a new 23-page brochure, *Physical and Performance Properties of* PARAPLEX *and* MONOPLEX *plasticizers.*

PARAPLEX *and* MONOPLEX *are trademarks, Reg. U. S. Pat. Off. and in principal foreign countries.*

Chemicals for Industry

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

PARAPLEX G-54

TRONA® AMMONIUM PERCHLORATE

Has Been Qualified *in Performance* by Every Manufacturer and Program in Solid Propellant Technology

What better testimonial can there be for a solid rocket fuel oxidizer than to be performance proven on every leading solid missile in our national arsenal? TRONA Ammonium Perchlorate gives more than "paper promises"... goes further than merely meeting specifications. The past, present, and future of dependable solid propulsion stems from the contributions made by AP&CC, from the earliest development of solid materials to the drawing boards for tomorrow's space craft. By every solid fuel standard—reliability, portability, uniformity, and reproduceability—TRONA Ammonium Perchlorate is the ideal oxidizer; more than ever before the real measure of solid propellant capability.

American Potash & Chemical Corporation

3000 West Sixth Street, Los Angeles 54, California • 99 Park Avenue, New York 16, New York

PRODUCERS OF: BORAX · POTASH · SODA ASH · SALT CAKE · LITHIUM · BROMINE · CHLORATES AND PERCHLORATES
MANGANESE DIOXIDE · THORIUM · YTTRIUM AND RARE EARTH CHEMICALS

Washington
Newsletter

CHEMICAL WEEK
October 15, 1960

A major overhaul of FDA's handling of drugs is recommended by independent investigators who studied the agency's operations in the wake of the scandal over Dr. Henry Welch's outside financial activities.

The report is surprising in two respects. The committee of university professors under the aegis of the National Academy of Sciences was assigned to review scientific decisions made by Welch on new-drug applications to see whether they were "influenced." The committee reviewed a sample of 29 cases and reported in eight typewritten lines that the decisions appeared to be "acceptable" and that they found "no evidence of disregard for the public health." This doesn't really answer the question they were assigned to study.

At the same time, the committee went far beyond its assignment and made a number of suggestions for reforming operating procedures and duties of FDA only remotely connected with the Welch case. Their recommendations back up some of the proposals made by Sen. Estes Kefauver (D., Tenn.) as a result of his probe of drug prices.

The most significant recommendation is that FDA be required to pass on the efficacy as well as safety of new drugs. This is one of the first recommendations Kefauver made. It is aimed mostly at worthless patent medicines but also affects a gray area of prescription drugs whose real effectiveness is in question. Health, Education & Welfare Secretary Flemming now endorses this proposal too. But it will raise some ticklish questions about whether FDA should approve a proliferation of almost-identical drugs that confuse the doctor but may just have slightly different benefits for different patients.

Flemming agrees with all the other recommendations except one, which he says needs further study: combining into one agency the authority of FDA and the Federal Trade Commission on approval, inspection, labeling, promotion and advertising of drugs. This raises problems of government administration.

The other committee recommendations: require drugmakers to keep records and report on clinical experience with new products; require certification of all antibiotics, not just those invited to be certified before '50; more FDA factory inspection; more complete labeling (which FDA has already formally proposed); keep records of scientific basis for FDA decisions of new drugs; expanded research on methods of drug testing and standards; establish a permanent scientific advisory committee; and expand FDA budget and personnel.

The report of this committee, headed by Dr. C. Phillip Miller of the University of Chicago Medical School, will carry great weight when Senator Kefauver begins hearings early next year on his omnibus drug bill now in preparation.

Washington Newsletter

(Continued)

The report of other investigators—on whether other FDA employees have conflicting interests or have been influenced from outside—is due shortly.

•

Development of Latin-American resources under the new Inter-American Development Bank program will lead to new demand for chemical products, new opportunities for CPI investment.

The projects anticipated are mostly social- and welfare-oriented, but industrial stimulation is implicit. Among the first requests for aid received, for instance, are projects for spread of agriculture into southern Paraguay and southern Argentina, where potentially good land needs developing. Venezuela and Colombia have submitted proposals for a network of water supply systems to service smaller cities, which will help provide new industrial sites.

Final approval of the proposed projects must await Congressional appropriation of the money for the fund next year. But there is no reason to expect Congress to short-change the program. Both Presidential candidates are heartily in favor of it.

•

Surcharges on shipments under 1,000 lbs. are being allowed increasingly by the Interstate Commerce Commission. Latest is for the Eastern Central Motor Carriers Assn. Similar extra rates of 10% or a $1 maximum have been okayed for New England and the Middle Atlantic states.

The carrier groups cite rising operating costs, which are accentuated with small shipments, as the reason for the levies. Some shippers are diverting traffic from motor common carriers to railway express, parcel post, shipper cooperatives, railroads and private trucks to get away from the surcharge.

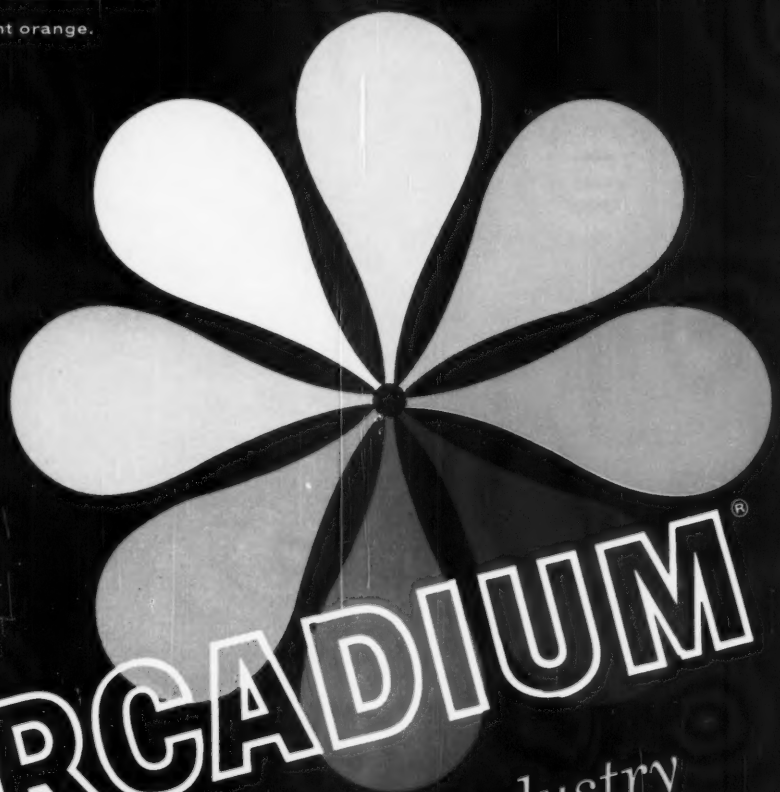
•

Highly significant report on U.S. atomic energy policies has just been released by the Congressional Joint Committee on Atomic Energy. It is a 2,000-page study by Robert McKinney, who has represented the U.S. in atomic energy conferences and is broadly endorsed by Committee Chairman Clinton Anderson (D., N.M.).

Among the conclusions are that the "nonpower" atomic field has not gotten enough attention. More emphasis should be placed on use of atomic materials in research, the life sciences and industry. At the same time, the U.S. with other nations should concentrate on the search for low-cost energy, "not only from reactors using the conventional steam or gas turbine cycles but also from direct-conversion systems, controlled thermonuclear systems and other advanced concepts."

The McKinney report puts high emphasis on development through internationalized joint projects wherever possible.

Mercadium Colors are a unique chemical pigment development patented by Imperial. The properties of mercadium colors are such that they are both versatile and useful in plastics as well as paint and enamel finishes and printing inks. Compounded of the sulfides of mercury and cadmium, mercadium pigments have permanent non-bleeding, heat resistant characteristics that make new color effects possible within the range of shades from dark maroon through light orange.



Imperial
MERCADIUM®
pigments for industry

World's largest producer of chemical pigment colors

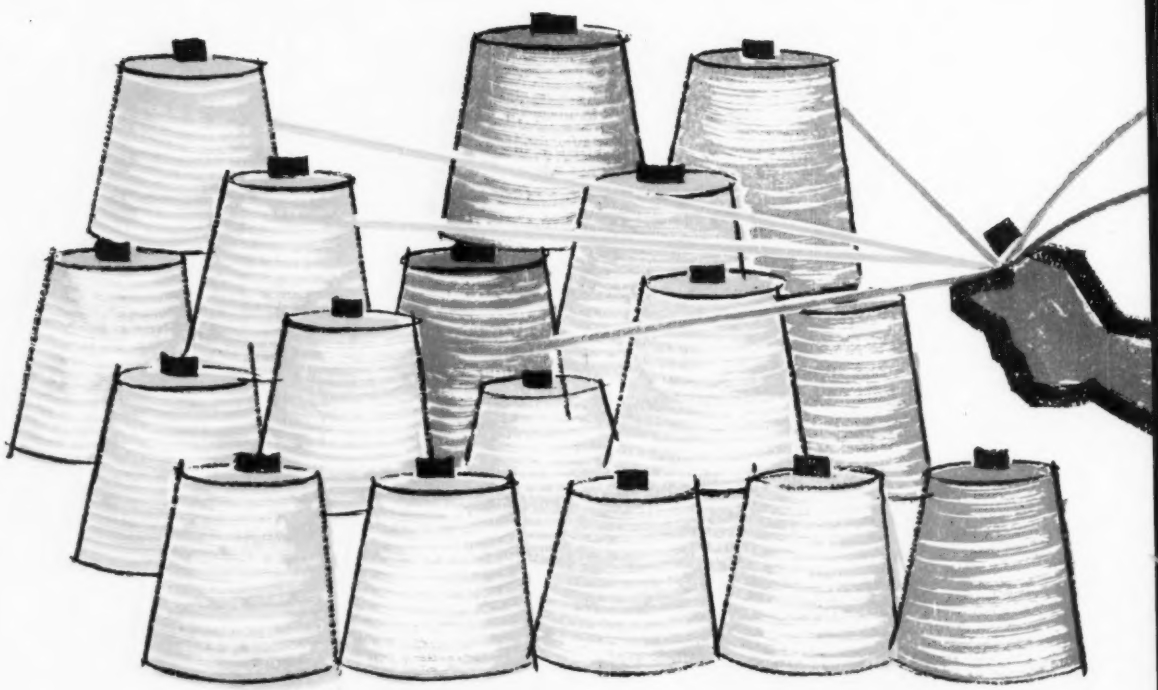
For samples and further information, see the Imperial representative or write to

IMPERIAL COLOR CHEMICAL & PAPER
PIGMENT COLOR DIVISION, **GLENS FALLS, N. Y.**

a department of
Hercules Powder Company
INCORPORATED

Boston • New York • Philadelphia • Minneapolis • Cleveland • Detroit • Cincinnati • Atlanta • Louisville • Chicago • St. Louis • Kansas City
Houston • Dallas • New Orleans • Los Angeles • Oakland • San Francisco • Portland • Seattle • Toronto, Ont. • St. Johns, Que. • Vancouver, B. C.

chemicals on the move...in textiles



New fabrics, fibers and finishes are better than ever. Modern textile chemistry has created stronger, tougher tire cord, true wash-and-wear clothing, and processes that render fabrics resistant to water, grease, creasing, and even bacteria.

To anticipate the constant progress in textiles, Olin Mathieson is on the move. To keep pace we are increasing caustic/chlorine production in growth areas...adding new plant facilities for a wide range of polyols and surfactants...marketing urea of outstanding quality from a new high-purity process. Current research on a new continuous bleaching process promises a significant advance in this basic operation.

Change is the challenge, and the future depends on the ability to predict change and prepare for it. As a step in providing for your future let us review your chemical requirements now. In terms of future—or present—our experience in chemical supply may be useful.

Olin Mathieson

CHEMICALS DIVISION, BALTIMORE 3, MD.

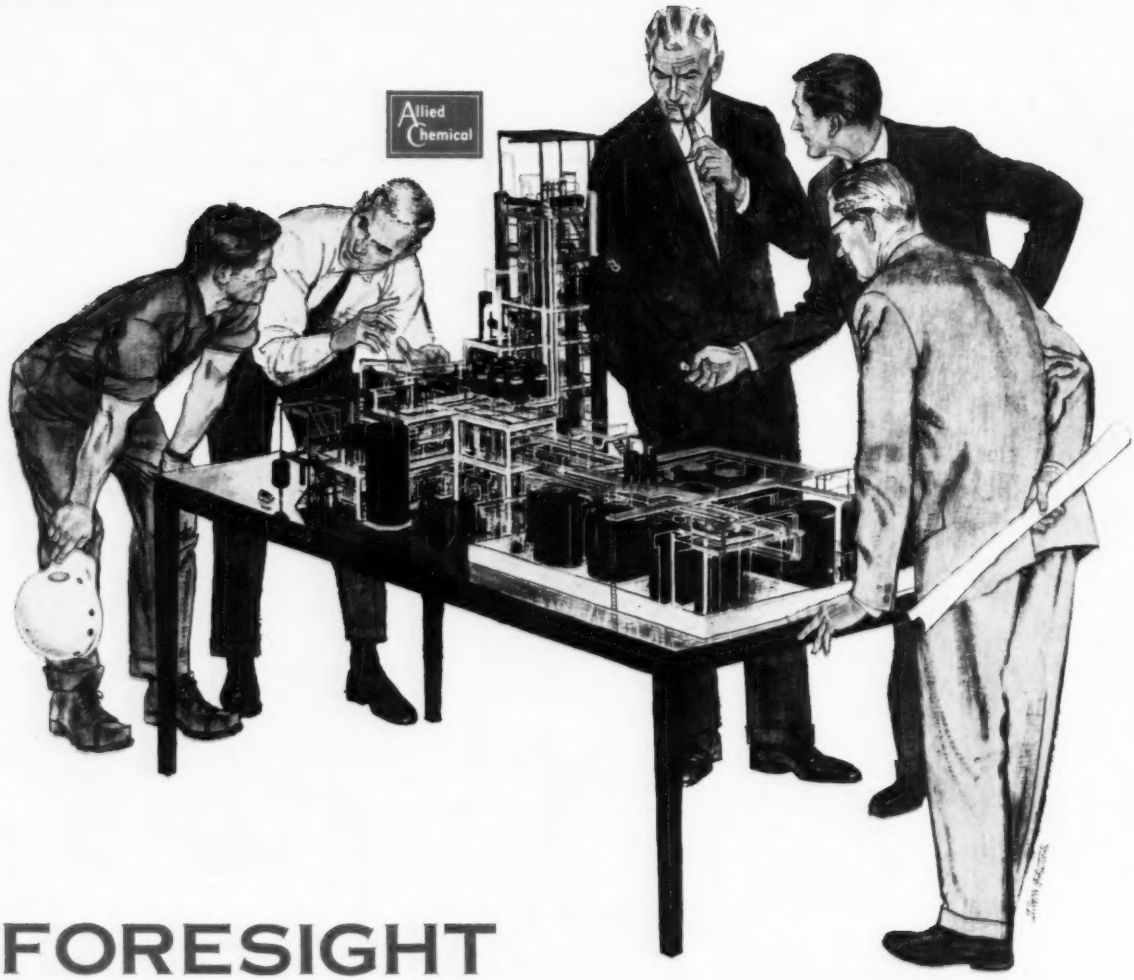
CHEMICALS

BLOCKSON

Trisodium Phosphate • Trisodium Phosphate Chlorinated • Sodium Tripolyphosphate • Tetrasodium Pyrophosphate Sodium Hexametaphosphate • Monosodium Phosphate • Disodium Phosphate • Sodium Acid Pyrophosphate • Tetrapotassium Pyrophosphate • Sulfuric Acid • Hydrofluoric Acid • Sodium Silicofluoride • Sodium Fluoride • Teox® 120 Surfactant

MATHIESON

Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Soda • Chlorine • Formaldehyde • Hydrazine and Derivatives • Hypochlorite Products
Methanol • Muriatic Acid • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chlorite Products • Sodium Methylate • Sulfur (Processed)
Sulfuric Acid • Urea • Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Propylene Oxide • Propylene Glycol • Polypropylene Glycol
Propylene Dichloride • Ethanolamines • Glycol Ethers • Surfactants • Ethylene Dichloride



FORESIGHT

To accelerate and substantiate engineering and construction schedules...

To reduce drafting revisions and eliminate costly field changes...

To train eventual plant operators...thereby reducing initial investment cost, CATALYTIC and client personnel study a pre-construction model of the phenol expansion at Philadelphia for the PLASTICS AND COAL CHEMICALS DIVISION of Allied Chemical Corporation.

This important phase of CATALYTIC procedure demonstrates our ability to meet the urgent needs of modern industry.

Our assignment on this significant new plant includes engineering, procurement and construction... another example of undivided responsibility.

CATALYTIC

CONSTRUCTION COMPANY
PHILADELPHIA 2, PENNSYLVANIA

In Canada: Catalytic Construction of Canada, Limited; Sarnia, Ontario

How Oil Makers Are Pushing Petrochemicals

Reorganizations last year freeing petrochemical operations

Companies involved:	*Type of reorganization:*	*What it should do:*
Cities Service Co.	Formation of inclusive division for all petrochemical operations	Coordinate and centralize research, marketing and investment opportunities
Gulf Oil Corp.	Company-wide decentralization toward division autonomy	Strengthen petrochemical operations
Socony Mobil Oil Co.	Newly formed Mobil Chemical Co., operating division	Establish extensive petrochemical operations in a variety of fields
Signal Oil and Gas Co.	Acquired petrochemical operation through merger with Eastern States Petroleum & Chemical Corp.	Allow entry into new fields of petrochemical operations
Sinclair Oil Corp.	Joint venture with Koppers Co., Inc.	Combine technical and marketing know-how to mutual advantage
Standard Oil Co. of California	Centralization of chemical companies and activities under California Chemical Co.	Provide greater emphasis on, expansion of petrochemical business
Standard Oil Co. (Indiana)	Centralized petrochemical operations in Amoco Chemicals Corp.	Improve competitive position
Standard Oil Co. (New Jersey)	At time of Humble Oil Co. merger, Enjay Chemical Co. moved to division status	Prevent duplication; increase sales, marketing efficiency
Sun Oil Co.	Expansion of divisional petrochemical operations and increased emphasis on joint ventures	Stimulate further growth
Sunray Mid-Continent Oil Co.	Formation of new subsidiary, Sunray Chemical Co.	Provide flexibility for petrochemical diversification
Tidewater Oil Co.	Revitalization through plant expansions in joint venture with Collier Carbon & Chemical Corp.	Give company access to wider petrochemical fields
Union Oil Co. of California	Petrochemical subsidiary in new joint venture and plant expansions	Increase geographic and product diversification

Oil Companies Reshuffle for Chemical Game

Old-line petrochemical producers will soon be feeling a hotter competitive breath on their necks. Oil companies are emphasizing petrochemicals with new vigor and a "chemical" approach. In the last year, a spate of petroleum companies have recast their corporate structures in favor of chemical production. Object: a boost for sagging petroleum profits.

The reorganization of California Chemical Co. (*CW, Oct. 8, p. 37*) and the recent styrene joint venture by Sinclair Oil and Koppers (*CW, Feb. 13, p. 23*) are two of the latest steps in a march that is rapidly becoming a parade. Other highlights of the past 12 months (*see chart above*) delineate a trend that poses a growing competitive threat to long-established petrochemical producers.

Oil companies are taking three basic organizational approaches to petrochemical ventures:

(1) Joint ventures—formed to exploit interests in petrochemicals with either chemical companies or other petroleum companies.

(2) Expansion of company's established petrochemical division—formerly operated merely as a convenient outlet for the company's numerous side products.

(3) Formation (e.g., by merger, acquisition or internal development) of subsidiary or autonomous companies designed to be full-fledged petrochemical manufacturers and marketers.

Joint Venture: The first two, joint ventures and division expansions, lead the list in a CHEMICAL WEEK survey.

"The reasons why Sinclair entered in a joint venture with Koppers are simple," C. W. Hardell, vice-presi-

Do Oil and Chemicals Mix?

Petrochemical men, caught in the middle, find differences between . . .

The Oil Mind	The Chemical Mind
Looks for immediate profits	Takes long-range-profit point of view
Is methodical, won't be rushed	Values timing, moves rapidly
Concentrates on single products	Believes in diversification
Is accustomed to large cash flow, big expenditures	Combines smaller cash flow with long-range investments
Produces at highest possible rate	Takes calculated risks on forecasts of greater demand
Builds the "biggest" facility	Tailors to meet present — and estimated future — needs
Prefers to increase amount of product irrespective of earnings	Will increase quality, number of products to gain on competition

dent of Sinclair-Koppers Chemical Co., told CHEMICAL WEEK. "Sinclair has the feed stock; Koppers has the manufacturing and marketing experience. We can dovetail operations to best mutual advantage."

On the other hand, Socony Mobil Oil Co., which disclosed the formation of Mobil Chemical Co. in June, has transformed its former petrochemicals division into what it calls "a complete, verticalized operating division. A good deal more than a reorganization, it's a flexible organization to concentrate exclusively on the profit-making potentials in chemicals."

Divisional Approach: The reason for Socony's move, according to Mobil Chemical's President Paul Keyser, also executive vice-president of the parent company: "We've set out to capture extensive business in petrochemicals, a highly competitive but profitable field." Corporate executives spent two years studying the situation.

Since the old petrochemical division accounted for some $90 million of Socony's annual gross, they decided the "operating division" approach, based on division autonomy where possible, would best suit the company's needs.

'Chemical' Look: Even with a carefully planned organizational structure, backing by the third-largest petroleum company in the world and a healthy history in petrochemicals, Socony Mobil's venture gets headshakes from some "old timers" in the petrochemical industry. They view the rush of petroleum companies into petrochemicals as an invasion of their territory, which will upset the marketing and profits picture.

Opinion of several of these petrochemical men with regard to the Mobile venture may be summed up as follows: "They call it diversification and a logical technical step, but they'd do better going into the paper business or doing what they've always done—dig more holes in the ground," one executive of a venerable petrochemical company said.

Despite the gloom of the "old timers," Socony Mobil and many other companies like it apparently have realized some of the mistakes the oil companies have made which have brought them to today's retrenchment in the oil world. The world situation, lower octane ratings and the invasion of the small cars have hurt the petroleum industry, but oilmen can't blame external forces when they talk about overproduction, overcapacity and underdiversification.

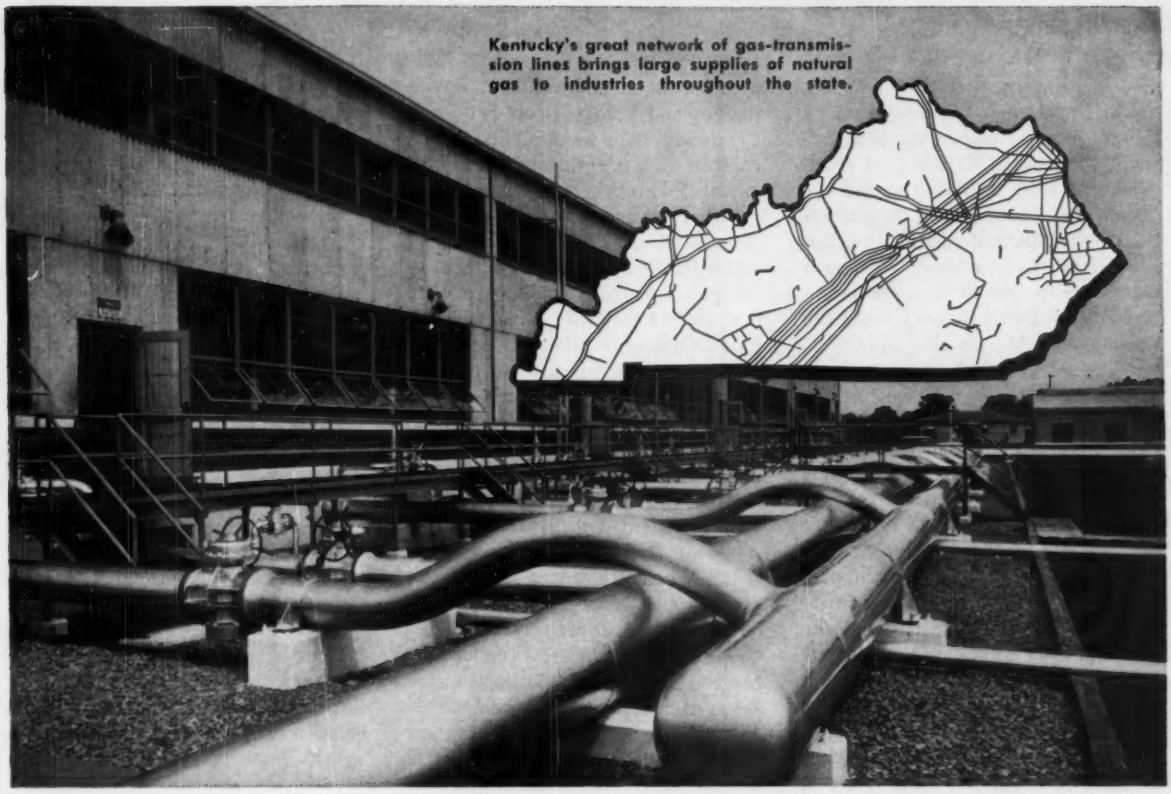
The petroleum companies entering the petrochemical race are, for the most part, lean and trim, staffed with the best available technical and marketing specialists who realize there's a bright future in petrochemicals for those with stamina enough to stick it out.

Standard Oil Co. (Indiana), from its own experience and view of the trend in petrochemicals, recently centralized all petrochemical operations and chemical companies into its Amoco Chemicals Corp., a wholly owned subsidiary with autonomous control over development, manufacture and sale of petrochemicals. Amoco Chemicals, however, will continue to use the resources of Standard's entire company.

Why Subsidiary Company: Standard's Executive Vice-President Robert C. Gunness explains, "We chose this approach because we believe that the development, manufacture and marketing related to chemicals is sufficiently different from the oil business to recommend consolidation of all functions into a single center of action and responsibility."

In addition, almost all surveyed companies agree that their own corporate managements are aware of the difference in approaches to oil and chemicals and allow great freedom to push petrochemical expansion. Sun Oil Co. points to the emergence of Sun-Olin and AviSun in the past three years and to its own divisional expansion. A company spokesman says, "This has been made possible by management flexibility, which has permitted opportunities to be grasped and opportunities to be generated."

Administrative Problems: Despite large quantities of money and increasingly sophisticated boards of directors, the newer entries in the petrochemical field have had to contend with administrative difficulties which aren't cov-


Kentucky's great network of gas-transmission lines brings large supplies of natural gas to industries throughout the state.

Natural Gas... Another Great KENTUCKY ASSET

IF YOUR COMPANY'S progress and profits hinge in any way on natural gas, *look to Kentucky.*

Kentucky produces an average of more than 72 BILLION cubic feet of gas each year, and new wells are drilled almost daily. Tremendous pipelines bring in some 50 BILLION additional cubic feet, and this volume of "imports over exports" can be greatly increased on demand.

As a matter of fact, more than three-quarters of Kentucky's 120 counties have large supplies of natural gas presently available for industrial use.

Kentucky also has tremendous resources in coal, oil, electric power, water, silica sands, clays, limestone, fluorspar. Combine these factors with Kentucky's central location, its favorable labor climate, its record number of financial plans for new and expanding industries . . . and you readily understand why Kentucky industry is growing 55% faster than the national average.

We are eager to give you the entire Kentucky story. Tell us your needs, and we will gladly send you a complete, well-organized, professional analysis of Kentucky's ability to fulfill them. Your inquiry will be held in confidence, of course.

Address: Lieut. Gov. Wilson W. Wyatt, or
E. B. Kennedy, *Commissioner,*
Kentucky Department of Economic Development
750 State Capitol Building, Frankfort, Kentucky

COMMONWEALTH OF
KENTUCKY
WHERE BIG THINGS ARE HAPPENING

ered in company operations manuals.

Chief problem was summed up by the president of one of the new, offshoot companies: "Our biggest headache," he said, "is trying to get our people to adjust from petroleum-thinking to chemical-thinking (*see box, p. 48*). We have a lot of good men whom we've moved over to petrochemicals but they haven't made the transition yet."

Gunness, at Standard of Indiana, elaborates on the same idea: "At the outset, the selection of key people from within our consolidated company received much attention. Next, it was necessary to attract experienced chemical people from outside to round out our organization.

"The reorientation of research, particularly in the areas related to marketing and development, is still under way and must continue to receive attention. The necessity for rethinking our approaches in chemicals, insofar as marketing and research are concerned, is obvious. Less obvious, but nonetheless important, we found out, was doing the same thing with respect to manufacturing.

"A common misconception is that chemical operations are similar to oil company operations. We have found out—in a sometimes painful fashion—that this is not always true. Thus, we have also had to devote considerable effort to putting together an experienced and knowledgeable manufacturing team."

Like a child with a new set of blocks who doesn't know what to build, one company representative frankly admits that one of its greatest problems now was to decide just what it was going to manufacture. For the most part, the companies engaged in joint ventures have not had either of these problems to a great extent. And this is one reason why they prefer the joint venture over the independent approach.

Other Organizational Highlights: In addition to the companies already named, a number of new sources of potential competition to petrochemical manufacturers have recently emerged. Cities Service Co., which underwent corporate streamlining recently, established a Petrochemical Development Dept. in April of this year. As a division of Cities Service Research Co., the new centralized department will enlarge petrochemical activity, keep apprised of new investment opportunities and keep tabs on Petroleum Chemicals, Inc., which Cities Service controls 55% (Continental Oil has the other 45%).

Signal Oil and Gas Co. acquired a petrochemical operation last year which in '59 boosted sales 40% over the previous year. Preliminary work has started toward expanding the product line to include the pure chemicals necessary in manufacture of plastics and synthetic yarns.

When Standard Oil (New Jersey) created the new Humble Oil & Refining last December, Enjay Chemical Co. rose in status from a subsidiary of Esso Standard Oil to full division status of Humble. Enjay's President J. E. Wood III tells *CW* the new setup would "coordinate supply and demand, place all petrochemical marketing and development under one hat and eliminate duplication" in the Jersey-Humble chemical complex.

Until last August the firms under Sunray Mid-Continent Oil Co. had concentrated their petrochemical efforts in the area of limited basic component by-products from refining operations and a few joint ventures. The organization of Sunray Chemical Co. as a wholly owned subsidiary means the company will "actively engage in all phases of the petrochemical business when there is expectation for future growth and profit," according to Paul E. Taiaferro, Sunray Mid-Continent's president.

Two other companies bear watching, too. Industry observers expect to see both Pure Oil Co. and Atlantic Refining Co. edging into petrochemicals within a few months.

These are just the highlights. Every petroleum company contacted indicated planned growth in petrochemical operation, through increased product lines and marketing, contemplated joint ventures and plant expansions, under way or on the drawing board.

High-Gear Competition: The consensus of the companies contacted is that the petrochemical industry can look for stiffer competition both from established companies and from newcomers. Many oil executives expect increasing competition from other basic petroleum companies to be their biggest competitive headache in the future, but they do not underestimate the "marginal producers, who will inevitably crop up from time to time."

James McDonald, assistant general manager of Tidewater's Western Division, expects stronger competition from oil companies, not only for petrochemical markets but also from "oil companies shopping around for joint ventures. Almost every oil refiner has potential raw materials for ventures with chemical companies. There is competition for joint ventures, too."

Several companies either have experienced or anticipate competition with some of their customers. Most companies are trying to avoid this embarrassing state, but plan to see it through if it arises.

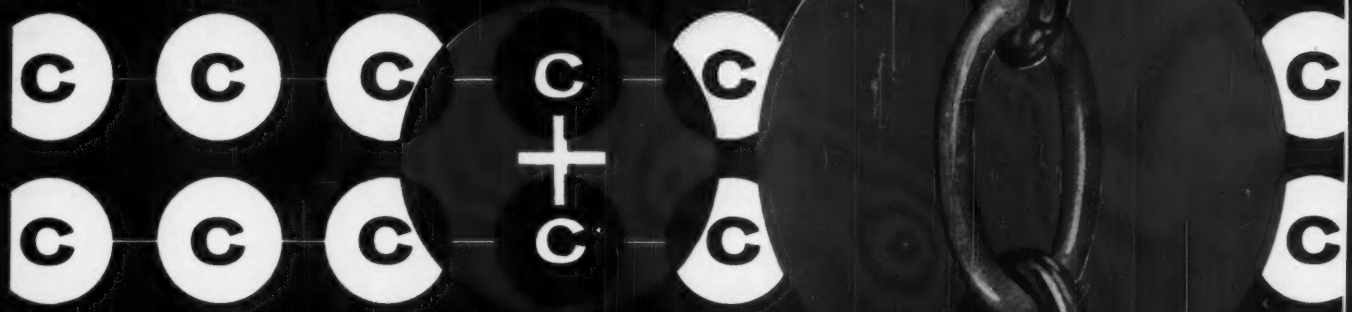
Guesses at the Future: Although profits have generally lived up to (and often exceeded) expectations, predictions cover a wide range.

- Pessimistic: "We're in for a big economic shake-up and complete realignment in the industry. . . . Why do oil companies think they can be better at chemicals than they have been at oil? . . . It takes more than dollars to be a success in this industry."
- Optimistic: "There are no limits to how high we can go. Markets will increase more rapidly than companies can keep up with them."

The general feeling lies somewhere in the middle. Most oil men acknowledge research and marketing strength to be the keys to success—and even survival—in petrochemicals. They expect to see more "chemical" men in the top ranks of petrochemical companies, and see them encouraging greater diversification, research in unique areas and better technology to improve the rate of return.

There seems little doubt among these observers that profit margins will drop as competition goes up. But there's no doubt that sales will increase, too, resulting in enough profit for petrochemicals still to be an incentive industry. This will be true especially as "petrochemicals continue to invade markets previously held by other products as well as creating their own outlets."

A company president in New York perhaps best sums up the attitude of the newly petrochemicals-conscious oil companies: "The future of petrochemicals looks bright to us as a way to augment our present oil activities. But, petrochemcials is not 'bread and butter' for us. We are still an oil company."



DI-CUP... *Key Link in Cross-Linking Polyethylene*

Di-cup, Hercules dicumyl peroxide, is a source of free radicals, which are highly effective in chemical cross-linking. It provides a simple, economical, and practical means of cross-linking low-density polyethylene.

Cross-linked polyethylene is a thermoset material resistant to softening and deformation at high temperatures. It shows no evidence of environmental stress cracking and it is resistant to many solvents at high temperatures.

This development opens new markets for products that require superior toughness, flexibility, impact strength, and chemical resistance.

For more information on Di-cup, write

Oxychemicals Division
Naval Stores Department
HERCULES POWDER COMPANY
INCORPORATED
910 Market Street, Wilmington 99, Delaware

NO Pb IN OUR BRITCHES

AMERICAN

AMSCO is first in sales because AMSCO is first in service.

Wherever your plant is located, American Mineral Spirits Company can deliver solvents right to your door quickly, economically. No matter how you order—by the barge, tank car, tank wagon, or by the drum—AMSCO's nationwide network of refineries, storage terminals, and distributors gets the shipment to you *fast*.

Along with this unmatched service, AMSCO is first in research and technical aid. Whatever your solvent needs, specify AMSCO. You'll get what you want, where you want it (and because there's no lead in our britches), *when* you want it.

For more information, just call or write the AMSCO office nearest you, or General Eastern Offices, Murray Hill, New Jersey.

AMSCO

MINERAL SPIRITS COMPANY

New York • Chicago • Los Angeles

QUALITY
PLUS
DISTRIBUTION
EQUALS
SERVICE

WHEN YOU WANT THEM...
WHERE YOU WANT THEM...

Imperial Chemical Industries Ltd.

Ammonium Chloride, Grey and White • Ammonium Bicarbonate USP • Ammonium Carbonate • Bleaching Powder Tropical 34%-36% Cl_2 • Calcium Formate • Chlorinated Rubber • Copper Cyanide • Potassium Cyanide • Sodium Cyanide, all grades • Zinc Cyanide • Sodium Aluminate • Sodium Bicarbonate USP and Tech • Sodium Carbonate Monohydrate • Sodium Perborate • Trichlorethylene, all grades • Urea, 46% Tech. • 3,3,5 Trimethyl Hexanol • 2:4 Dimethyl 6-Tertiary Butyl Phenol • Hexachloroethane.

Peter Spence & Sons Ltd.

Aluminum Sulphate, Iron Free • Ammonia Alum • Butyl Titanate • Potassium Alum • Titanium Potassium Oxylate • Cobalt Molybdenum Catalysts.

Deepwater Chemical Co., Ltd.

Iodine, Resublimated USP and Reagent • Potassium Iodide, USP and Reagent • Potassium Iodate, USP and Reagent • Special Potassium Iodide Mixtures • Cupros Iodide, Tech. • Sodium Iodide.

Chemical Manufacturing Co.
INCORPORATED

444 Madison Ave., New York 22, N. Y.
MUrray Hill 8-8700
714 W. Olympic Blvd., Los Angeles 15, Calif.
Richmond 9-7235
114 Sansome St., San Francisco 4, Calif.
YUkon 6-3787

KEY CHANGES

Henry L. Ford to president and **L. K. Eilers** to vice-chairman, board of directors, Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Co. (Kingsport, Tenn.).

Robert W. Kerr to president, Fluor Products Co., a division, and to vice-president and board of directors, parent company, The Fluor Corp., Ltd. (Los Angeles).

Jack H. Rosfeld to president, Hood Chemical Co. (Ardmore, Pa.).

Wayne B. Brewer to president, Cooper Tire & Rubber Co. (Findlay, O.).

David J. Benjamin and **William J. Zellerbach** to board of directors, Crown Zellerbach Corp. (San Francisco).

Roy L. Cammann to senior vice-president, **Bennett D. Buckles** to vice-president, sales, **James M. Maddox** to vice-president, operations, **Damon A. Peterson** to vice-president, technical, Plastics Division, Allied Chemical Corp. (New York).

Edward J. Williams and **Harold G. Shelton** to vice-presidents, General Aniline & Film Corp. (New York).

Jack D. Rice to vice-president, Koppers Co., Inc. (Pittsburgh).

Cleveland B. Hollabaugh to vice-president, research and patents, Michigan Chemical Corp. (St. Louis, Mich.).

Thomas M. Huber to vice-president, Owens-Illinois International, S.A., subsidiary, Owens-Illinois Glass Co. (Toledo).

William C. McCammon to vice-president, supply and transportation, Standard Oil Co. of California (San Francisco).

Ralph J. Schilthuis to vice-president, production, Humble Oil & Refining Co. (Houston, Tex.).

Clayton F. Devine to executive vice-president, board of directors, Ottawa Silica Co. (Ottawa, Ill.).

William D. Miller to executive vice-president, **Thomas W. Allison** to board of directors, Consolidated Aluminum Corp. (Jackson, Tenn.).

Eugene Holman to board of directors, The Borden Co. (New York).

FYI:
Chemical Week Reprints

Metal Organics	$1	☐
Food Additives	$1	☐
European Chemical Market	$1	☐
Energy	$1	☐
Boron/Borax	$1	☐
Jet Fuels	$1	☐
Long-Range Planning	$1	☐
Propylene	$1	☐
Butylenes	$1	☐
Acetylene	$1	☐
Ethylene Chemicals	$1.50	☐
Foreign Trade	$1	☐
Cellulose	$1	☐
Petrochemical Treasures	$1	☐
Rating Research	$1	☐
Cost Accounting	$1	☐
World Sulfur	$1	☐
Aromatics in Trouble	$1	☐
Vertical Integration	$1	☐
Steroids	$1	☐
Contract Research	$1	☐
Atomic Energy	$1	☐
Ideas from Outsiders	$1	☐
Pharmaceuticals	$1	☐
Market for Waxes	$1	☐
Cost Cutting	$1	☐
Man-Made Fibers	$1	☐
Motivation Research	$1	☐
Petrochemicals	$1	☐
Plastics Outlook	$1	☐

Chemical Week
Reprint Dept., Room 2400
330 W. 42nd Street
New York 36, N. Y.

Please send me the CW Reports checked above. Enclosed is $ .....
Send price of ..... copies

(Bulk prices on request)

Textile Technology in Chemical Engineering

Fiber selection and its importance in filtration

At the very inception of filter fabric design, the key decision that must be made is the selection of the textile fiber or combination of fibers. Both natural and man-made fibers play a major part in filter fabrics.

Each of the many fibers has its own peculiar attributes to fulfill the different filtration requirements.

The natural fiber, cotton, offers the advantages of bulk, plus the high wet strength especially important in filtration. It is a relatively low cost material.

Filter press cloths made of filament yarns such as nylon have a slick, smooth surface for greater ease in cake discharge. Nylon also has excellent caustic resistance and outstanding physical properties.

Acrylic fibers have a high degree of acid resistance, good strength, and resistance to other chemicals and destructive organisms such as mildew and bacteria.

The characteristics of these and many other fibers are strong considerations in making the proper choice. All their properties, however, do not necessarily carry over automatically into the finished fabric. Fabric performance, regardless of fiber, is finally determined by the actual construction of the cloth.

To get *complete* information about filter fabrics, make sure you consult a specialist. The specialists who distribute Wellington Sears filter fabrics are fully equipped to help you select the medium that best answers your problems. Behind them, they have our 114 years of experience in providing quality fabrics to industry. For distributors' names, and a handy information booklet, write Dept. M-10.

Wellington Sears Company

FIRST In Fabrics For Industry

Wellington Sears Company, 111 West 40th Street, New York 18, N. Y.

Akron · Atlanta · Boston · Chicago · Dallas · Detroit · Los Angeles
Philadelphia · San Francisco

Walt Parker, who can duplicate and study virtually every pulping problem in a specially equipped laboratory, says you'll like doing business with Columbia-Southern

In the Pulp Laboratory at Columbia-Southern's Barberton, Ohio, Research Center, Walt Parker and his colleagues set up the full range of chemical situations encountered in commercial pulp mills. Thus they can study at first hand any particular questions important to mills using Columbia-Southern chemicals. Evaluation of customer formulations and methods have led to major savings and boosts in efficiency for a large number of pulp and paper producers.

When analyzing customer problems, the Pulp Laboratory engineers work closely with customer technical personnel, carefully checking every step along the way. This relationship insures *practical* results when the findings of the laboratory are put into operation in the customer's mill.

Concern that customers are getting the most efficient use of Columbia-Southern products is a principle followed throughout all departments. It is very evident in the regular activity of the Technical Service Engineers, for example, who provide consultation on unloading, storing, and handling potentially dangerous chemicals such as chlorine and caustic —to mention just one area of Technical Service responsibility.

Customer-oriented concern all along the line explains why so many leading organizations, representing all manufacturing industries, rely on Columbia-Southern for their basic chemical needs.

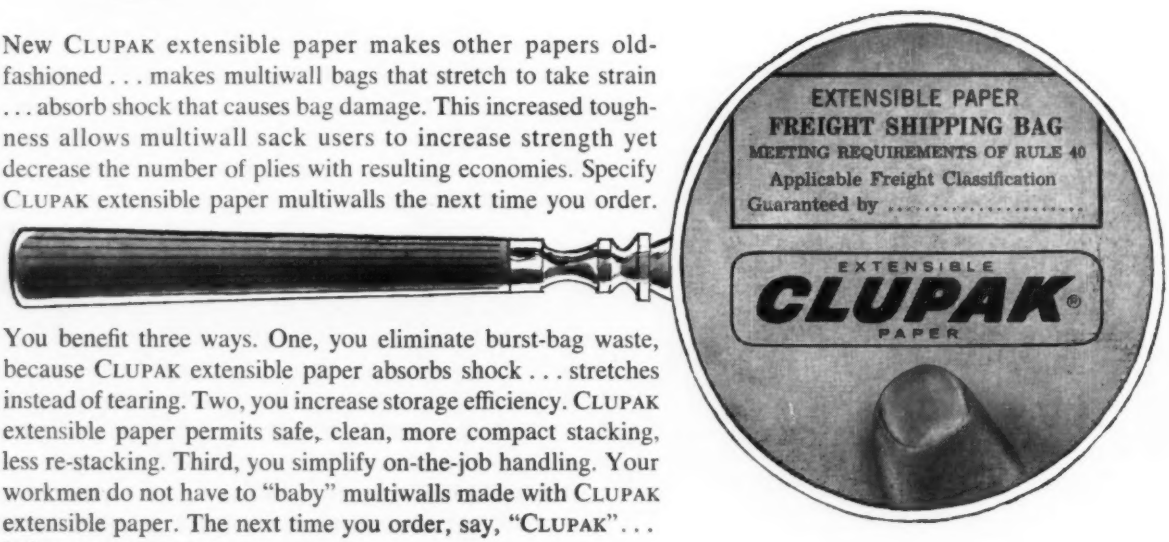
Anhydrous Ammonia, Barium Chemicals, Benzene Hexachloride, Calcium Chloride, Calcium Hypochlorite (Pittchlor®, Pittabs®), Carbon Tetrachloride, Caustic Potash, Caustic Soda, Chlorine, Chlorinated Benzenes, Chloro IPC, Chrome Chemicals, Hydrogen Peroxide, Muriatic Acid, Pacific Crystals, Perchlorethylene, Rubber Pigments (Calcene®, Hi-Sil®, Silene®), Soda Ash, Sodium Bicarbonate, Sodium Sulfate, Titanium Tetrachloride, Trichlorethylene

columbia | southern chemicals

COLUMBIA-SOUTHERN CHEMICAL CORPORATION • A Subsidiary of Pittsburgh Plate Glass Company • One Gateway Center, Pittsburgh 22, Pa.
In Canada: Standard Chemical Limited

ELEMENTARY...IT'S A EXTENSIBLE CLUPAK® PAPER* MULTIWALL BAG ...THAT'S WHY IT WON'T BREAK!

New CLUPAK extensible paper makes other papers old-fashioned . . . makes multiwall bags that stretch to take strain . . . absorb shock that causes bag damage. This increased toughness allows multiwall sack users to increase strength yet decrease the number of plies with resulting economies. Specify CLUPAK extensible paper multiwalls the next time you order.

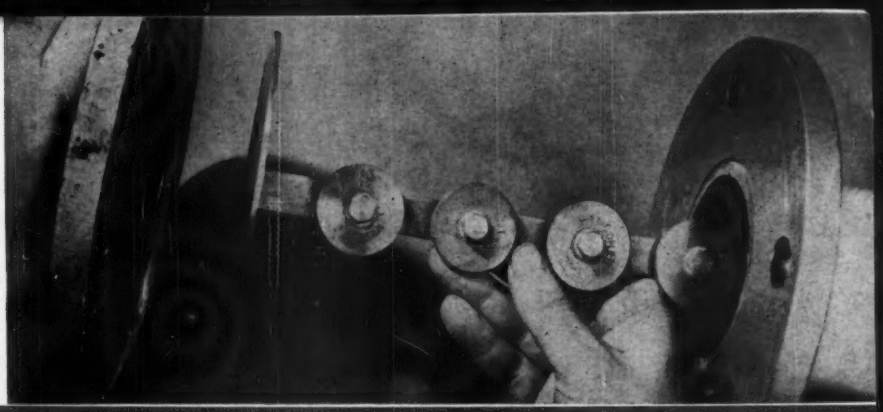


You benefit three ways. One, you eliminate burst-bag waste, because CLUPAK extensible paper absorbs shock . . . stretches instead of tearing. Two, you increase storage efficiency. CLUPAK extensible paper permits safe, clean, more compact stacking, less re-stacking. Third, you simplify on-the-job handling. Your workmen do not have to "baby" multiwalls made with CLUPAK extensible paper. The next time you order, say, "CLUPAK"... before you say paper.

*Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications. Clupak, Inc., 530 5th Ave., N. Y. 36, N. Y.

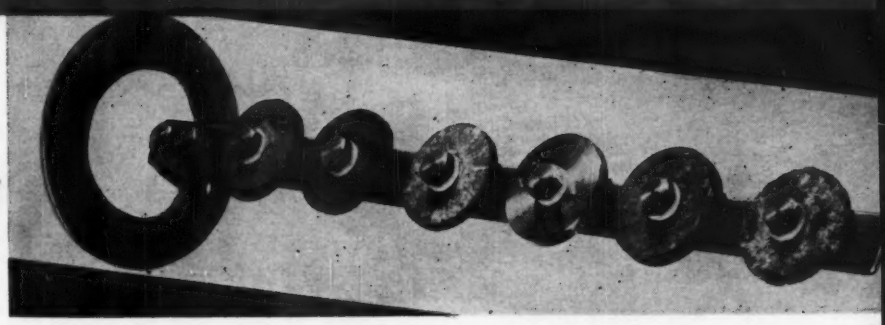
BEFORE

Potential valve materials, attached to Aloyco test rod, are put into stream piping.



AFTER

At end of test, specimens tell engineers which metals offer trouble-free service.



Field Tests Solve Valve Corrosion Problems

This week Linden, N.J., valve maker Alloy Steel Products Co. for the first time revealed the details of a successful corrosion test program it has run for its customers for several years. The program, set up to take the guesswork out of selecting valve and pipeline construction materials, is an easily followed example of how to run field tests that give quick results.

Test periods of 60 days are generally enough for engineers using the method to come up with satisfactory material recommendations. And Aloyco has designed a test rod that is easily inserted into pipelines, held in place by the pipe flanges. It can be mounted with insulators to prevent galvanic corrosion, and it is easily removed at the end of the test period *(pictures, above)*. Most other test rods or spools must be welded into the pipe to prevent them from being "lost" in the process stream.

Many of the larger chemical companies have had extensive corrosion test programs of their own for a number of years. But at the time Aloyco's program was begun the only outside helping hand chemical companies could expect in this type of corrosion testing came from The International Nickel Co. (its program is still in effect). Most valve makers supplied corrosion test specimens but left the job of devising test procedures to the chemical firms.

Among the problems: designing a test rod that puts the specimens in the process stream where they face the effects of maximum stream velocity; designing rods that keep pressure drop in the line to a minimum (Aloyco's rod produces a pressure drop that is equivalent to one globe valve placed in a 2-in. line).

Usually, samples sat on a plant engineer's desk for want of a test rod design—they sometimes still do. Yet, corrosion charts and tables, experience in other plants and laboratory and pilot-plant tests have never taken the place of actual plant tests in accounting for all the possible combinations of environmental effects such as temperature, pressure and stream velocity (*CW, July 5, '58, p. 51*).

On the Spot: The value of plant tests is emphasized by experiences in new plants. For example, Koppers Co. had corrosion problems with discharge valves for 40% sulfuric acid solution in the light oil treatment section of a new by-product coke plant. Aloyco had first recommended valves cast of a high-chrome-nickel stainless steel alloy. This was based on a theoretical acid solution. Under actual operating conditions, however, the stream turned out to be sulfuric acid plus organic reaction products such as sulfonic acid—and at temperatures as high as 135 F. Aloyco, using its field test program, was able to recommend the somewhat more expensive Hastelloy C as a valve replacement material, and three years of trouble-free operation have followed.

Something Extra: By drawing on services such as Aloyco's and Inco's, even the chemical companies that have their own corrosion programs are getting engineering extras. For example, Aloyco's experience in solving valve and pipeline problems may help cut down the number of specimens that must be tested to find the answers.

At U. S. Industrial Chemicals' Tuscola, Ill., plant, Aloyco had the answer to corrosion of Type 304 stainless steel valves in ammonium nitrate service after 30 days. To cover all bases, it suggested that test rods with four different alloy specimens be mounted to check for corrosion by the process stream (i.e., insulating the rod from the pipeline with Teflon washers and sleeves) and by galvanic action (i.e., specimens in contact with the pipeline). Examination showed galvanic action was the probable cause of the corrosion and that Type 316 stainless would be a better material choice than Type 304.

In other cases examination of the

STAUFFER PRODUCTS

AGRICULTURAL CHEMICALS DIVISION
Defoliants Fertilizers Fungicides
Grain Fumigants Herbicides
Insecticides and Miticides
Seed Disinfectants Soil Fumigants
Sulfurs, Ground and Refined

ANDERSON CHEMICAL DIVISION
Metal-Organics Metal Esters
Research Chemicals Metal Chlorides
Aluminum Acetylsalicylate

CONSOLIDATED CHEMICAL INDUSTRIES DIVISION
Sulfuric Acid Alums Bone Charcoal
Bone Meal Muriatic Acid
Hydrogen Chloride Ferric Sulfate

INDUSTRIAL CHEMICALS DIVISION
Acids: Boric, Muriatic, Sulfuric and Tartaric Aluminum Sulfate
Bone Charcoal Bone Meal
Boron Oxide Carbon Disulfide
Caustic Soda Carbon Tetrachloride Chlorides of Aluminum, Antimony, Boron, Columbium, Silicon, Tantalum, Titanium and Zirconium Chlorine
Chloroform Cream of Tartar Ferric Sulfate
Greases Hydrogen Animal Glues
Hydrogen Chloride Mesyl Chloride
Methylene Chloride Oleum Perchlorethylene
Potassium Nitrate Rochelle Salt
Sodium Carbonate Sodium Hydrosulfide
Sodium Sulfate Sulfur Chlorides
Sulfurs: Refined, Flowers, Roll, Rubbermakers and Insoluble Crystex™.

INTERNATIONAL DIVISION
Products of all Divisions

A. R. MAAS CHEMICAL DIVISION
Phosphoric Acid Phosphates
Photographic Chemicals Questex®

MOLDED PRODUCTS DIVISION
Battery Boxes and Fittings
Plastic Foam Plastic Pipe
Miscellaneous Molded Rubber and Plastic Products

NYOTEX CHEMICALS DIVISION
Hydrofluoric Acid, Anhydrous and Aqueous
Aluminum Chloride Aluminum Fluoride

STAUFFER-TEMESCAL COMPANY
Electron Beam Furnaces
High-purity refractory Metals and Alloys

VICTOR CHEMICAL WORKS DIVISION
Phosphoric Acid Phosphates of Ammonia, Calcium, Iron, Potassium and Sodium
Organophosphorus Compounds Chlorinated Trisodium Phosphate Phosphoric Anhydride
Phosphorus Chlorides Phosphorus Pentasulfide
Formic Acid and Formates Oxalic Acid and Oxalates Phosphatic Fertilizer Solution
Sodium Hypophosphite Methyl Parathion

WEST END CHEMICAL COMPANY DIVISION
Borax Lime Products Soda Ash
Sodium Sulfate

ANDERSON CHEMICAL DIVISION
Stauffer Chemical Company
Weston, Michigan

Kindly send me:
☐ Data sheet on _____ (COMPOUND)
for _____ (APPLICATION)
☐ Catalog of **Anderson Chemicals**
☐ **Stauffer Chemicals . . . Everywhere:** New publication with illustrations and non-technical description of the broad line of Stauffer Chemicals.

(Name)
(Company)
(Street)
(City)
(Zone) (State)
CW

test specimens has shown erosion rather than corrosion is the problem. Different valve trim (seat and disc) materials often solve the problem. For example, carbon steel in concentrated sulfuric acid service is usually protected from corrosion by a sulfate film that forms on the surface of the metal. But high temperatures dissolve the film and high velocities of the process stream may wash it away, says Harold Templeton, Aloyco's chief metallurgist. The answer may be to use a stainless steel on which the chromium oxide film that forms offers good protection from high velocity.

Erosion problems might also call for a change in the type of valve used. For example, test results may lead to the discovery that gate valves instead of globe or Y valves have been used to throttle a process stream, says Elmer Holmberg, who heads the application of materials in the process industries for Inco.

Holmberg, who was formerly chief metallurgist for Aloyco, developed Aloyco's original test rod design. He points out that the project was an adventurous one for a valve maker. While specimens and test rods are not particularly expensive (e.g., Inco lists cost of test spools as about $5 each when made in quantity), the backup services that are required for visual and analytical inspection of the specimens could be $90-100 for each test run.

At those costs it is easy to see why services of this type are not widely offered. But it is also easy to see why companies that don't take advantage of them may be missing a good bet to augment their own test programs.

New Lease on Light

Keeping in step with the industry trend toward leasing equipment (*CW, July 11, '59, p. 53*). Westinghouse Credit Corp (Pittsburgh. Pa.) has developed a new leasing plan for factory and office lighting equipment.

Leases on fluorescent, incandescent and mercury lighting equipment can be written for two-, three- and five-year periods. Installation costs not in excess of 50% of the selling price of the equipment can be included as part of the leasing cost. Options to purchase the equipment at the end of the lease period may also be included.

Welding By the Book

In Midland, Mich., this week Herb Schmidt, Dow Chemical's superintendent of the materials of engineering laboratory, is beginning the second stage of what has often been tagged an impossible task—writing a manual to improve stainless steel welds. Within a short time Schmidt's five-man chemical industry team hopes to show the first draft of the handbook.

Two major steps remain once the draft is completed—it must be discussed with the experts in the field; and the final physical form must be set. But by reaching this stage, Schmidt's team has reduced to 45 typewritten pages material that has eluded others for 10 years—and they have done it in one and a half years.

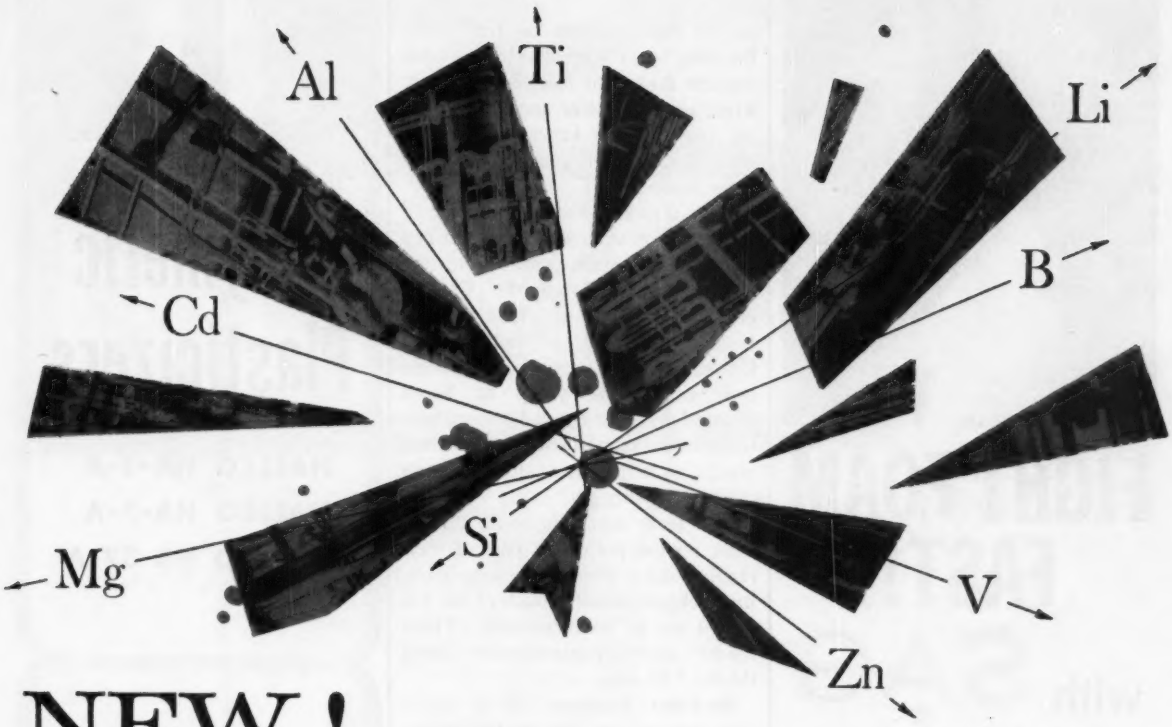
Welder's Headache: The welding of stainless steels, although now common practice in the chemical industry, has always presented headaches. Intergranular corrosion, stress corrosion cracking and other problems still show up once equipment has been put into service. And reasons for these difficulties still are not always clear.

About 10 years ago the Chemical Industry Advisory Board of the American Stadards Assn. studied the problems, got bogged down in welding procedures trying to solve them. Then the Manufacturing Chemists' Assn.'s Mechanical Technical Committee took over the job, appointed a subcommittee headed by Schmidt.

This group, which included Monsanto's Frank Whitney, Kodak's H. H. Brown, Food Machinery and Chemicals John Coakley and Union Carbide Chemicals' Jack Bates, has quietly and doggedly collected information on all phases of the problem. They simplified the task slightly by considering only wrought austenitic stainless (i.e., the chrome, nickel steels)—the most commonly used.

End-Product, Not Techniques: They further simplified the task by skirting the problem of welding procedures that mired previous groups. "We're interested in the finished product, not the welding technique," says Schmidt.

And the group was kept small. "We want to talk about it with panels of experts, or as a symposium, only after we've finished our draft. To do so beforehand would only slow us down,



NEW !

Expanded capacity in Pyrophoric Metal-Organics

Anderson Chemical Division of Stauffer Chemical Company, pioneer in the research and development of metal-organics...leading producer of metal-organics...has greatly expanded its capacity for making pyrophoric metal-organics of aluminum, boron, lithium, zinc and other metals.

The new plant at Weston, Michigan, is specifically engineered for commercial and custom production of a wide variety of pyrophoric metal-organics. These new facilities, combined with Anderson's unmatched experience in metal-organics, will provide new products for use in the solution of problems in plastics, pharmaceuticals, textiles, electronics, fuels and many other applications. Our staff of specialists has the facilities and experience to work out specific answers for you...then produce the desired metal-organic in the quantity you need.

Use the coupon to tell us your particular interest in metal-organics, alkyls, aryls and silicones, or send for the catalog of Anderson chemicals.

Write to Anderson Chemical Division of Stauffer Chemical Company, Weston, Michigan or 380 Madison Avenue, New York 17, N. Y.

Stauffer CHEMICALS — 75 YEARS OF SERVICE TO INDUSTRY AND AGRICULTURE

maybe even prevent us from ever finishing," says Schmidt. He hasn't yet decided how he'll handle that stage. Right now his major concern is piecing together the various parts that have already been completed by the team members.

Each member covered one phase of the job. For example, Bates worked on heat treatment, drew from the many sources within the Carbide organization, such as Union Carbide Metals and Linde, as well as from Union Carbide Chemicals. Within his own engineering group at South Charleston, Bates enlisted Tony Chadwick, whose major concern is pressure vessels, to help gather information on mechanical strength.

The team members were able to work on the project as part of their regular daily company assignments. But, Schmidt admits, much of the job turned out to be homework. "There are just too many interruptions during the day," he says.

Six-Point Program: As it stands now, the manual has six major sections. It will include information on the base metal—its composition, physical properties, surface finish, etc.—and on fabrication of the stainless steel equipment. The fabrication section will touch lightly on forming, machining, welding, heat treating, cleaning and surface preparation, but will not go into the details of how to actually make a weld.

One section will place emphasis on weld inspection techniques for determining porosity, penetration, incomplete fusion, etc.

Another section will attempt to define workmanship standards, come up with methods that can be used by the equipment purchaser to assure good workmanship by the fabricator (e.g., requirements that the fabricator produce a sample that will include all the types of welds to be used so that comparisons can be made with the finished product). And methods of evaluating a weld's susceptibility to intergranular attack and stress corrosion cracking will be included.

The manual, when completed, should help the larger chemical companies because it will have pulled together material that has been scattered throughout many plants. Also, smaller companies will have gained access to information they could not possibly have compiled on their own.

FIGHT FOAM FAST!

with SAG

SILICONE ANTIFOAM

CHEMICAL processors who use SAG Silicone Antifoam have made tremendous strides in fighting or controlling foam in many applications.

After a recent trial of SAG 47 Antifoam in a chemical plant, one customer reported: "This proves to be an excellent product for us. It requires smaller concentrations than previously used competitive products because of its lower viscosity and excellent dispersibility."

Years of research went into development of SAG Antifoams to make them *fight foam fast.* There are two types: SAG 470 Emulsion for aqueous systems; SAG 47 Fluid for non-aqueous systems. Just a few cents worth can eliminate thousands of cubic feet of costly, space-eating foam. Both products are shipped ready to use. And they're stable in storage. Mail the coupon today for samples and technical assistance.

UNION CARBIDE SILICONES

Dept. JC-4001

Silicones Division, Union Carbide Corporation
270 Park Avenue, New York 17, N. Y.
(In Canada: Union Carbide Canada Limited, Bakelite Division, Toronto 12.)

Send sample of ☐ SAG 470; ☐ SAG 47 fluid; and data on SAG Silicone Antifoams.

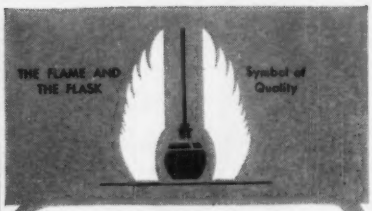
NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

"Union Carbide" and "SAG" are trade marks of UCC.



Polymeric Plasticizers

HALLCO HA-5-A
HALLCO HA-7-A
HALLCO HA-57-A

- Non-extractable
- Heat resistant
- Good permanence
- Non-migratory
- Excellent compatibility

For use with
VINYLS
CELLULOSICS
SYNTHETIC RUBBERS
POLYMERS

For complete information and prices, write or phone

The C. P. Hall Co. of Illinois
CHEMICAL MANUFACTURERS
5251 W. 73rd St., Chicago 38, Illinois
NEWARK • AKRON • CHICAGO
MEMPHIS • LOS ANGELES

Diverse manufacturing facilities . . . and experienced assistance in product development! Both are essential to successful production . . . and both are available to you at Penick.

Penick's **Confidential Development and Production** service takes "custom manufacturing" out of the realm of "cook-book chemistry" and makes our versatile research and production team an integral part of your organization. This unusual . . . but highly successful . . . approach is the result of gradual evolution during our long history in the chemical and drug manufacturing business.

As an experienced manufacturer, we can contribute vital assistance in process engineering that assures product quality and uniformity and the utmost economy in production.

If you anticipate the need for production assistance, make a point of calling Penick early. Your inquiry will always be handled in confidence at the highest executive level.

* **C**onfidential
Development and
Production

. . . is a unique service encompassing complete laboratory, pilot plant and manufacturing facilities. By cooperative planning early in process development, it assures the most advantageous, economical up-scaling. Particular success has been achieved with antibiotics and other fermentation products, aromatics, botanical derivatives and fine synthetic chemicals.

PENICK

Product Development Department
S. B. PENICK & COMPANY
100 Church St., New York 8 • 735 W. Division St., Chicago 10

PRODUCT NEWS FROM FISHER SCIENTIFIC

GAS PARTITIONER and LAB RECORDER make gas analysis faster and easier . . .

Fisher's "perfect partners" give you an easy, low-priced, time-saving system for analyzing complex mixtures of gases accurately. The Gas Partitioner can run an Orsat-type gas analysis in minutes. And its new partner—the Fisher Lab Recorder has a gearshift control that permits you to choose any of 10 chart speeds instantly.

The Fisher Lab Recorder has the speed and sensitivity to handle your recording job . . . and at a price of only $850.

For more detailed information, ask for two fact-filled booklets: FS-275 on the Partitioner; FS-220 on the Lab Recorder. Write to:

129 Fisher Building, Pittsburgh 19, Pa.

F-130

FISHER SCIENTIFIC

World's Largest Manufacturer-Distributor of Laboratory Appliances & Reagent Chemicals

Boston • Chicago • Ft. Worth • Houston • New York • Odessa • Philadelphia • Pittsburgh • St. Louis • Washington • Montreal • Toronto

HOW MANY SECONDS BETWEEN A "SITUATION" AND A sale?

We don't know. Only you know the answer. That is—if you happen to be one of the 409 advertisers to the Chemical Process Industries now using the Chemical Week BUYERS' GUIDE ISSUE.

You, of all people, know that the shortest possible line between buyer and seller is this unique, preferred directory and composite catalog...the one medium which gives you a point-of-purchase opportunity to tell your full product story.

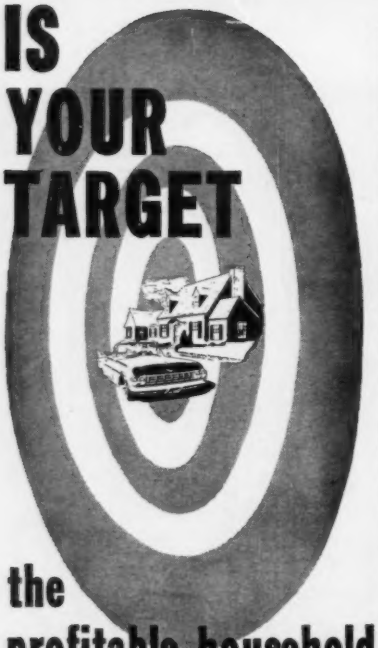
Lots of research and your own experience have proved to you that this is the one most complete and authoritative reference in the marketplace . . . the one CPI-Management instinctively reach for when they have immediate need for equipment, supplies, materials and services.

Next year's edition, bigger and better than ever . . . cover and content restyled for easier use . . . heavier stock . . . new service features being planned right now . . . plus more equipment company listings and more types of CPI equipment covered.

Be sure you budget your selling space now . . . in next year's BUYERS' GUIDE ISSUE.

Chemical Week BUYERS' GUIDE ISSUE

IS YOUR TARGET



the profitable household specialties market?

Formulating problems are simplified, and consumer acceptance increased when VEEGUM® is included in chemical specialties formulas.

Waxes, polishes, cleansers, detergents and a host of related products are now more effective because of VEEGUM. This is true in Automotive specialties, as well as Household products.

Water dispersions of VEEGUM suspend, thicken and stabilize. VEEGUM is thixotropic. It is non-toxic, non-irritating, white and opaque.

VEEGUM is colloidal magnesium aluminum silicate, refined and purified.

Write for formulas and technical data today.

Want a quick reference to a complete listing of all Specialties Department formulas? Send for our FORMULA FINDER.

R. T. VANDERBILT CO.,
SPECIALTIES DEPARTMENT
230 PARK AVENUE
NEW YORK 17, N. Y.

Please send:
( ) Bulletin 20C — Automotive Formulas
( ) Bulletin 30C — Household Formulas
( ) The Formula Finder
( ) Sample of VEEGUM

State Application .....

Name .....

Title .....

(Attach to your Company letterhead) P-21

EQUIPMENT

Pulverizers: Pallmann Pulverizers Co. (315 Newark St., Hoboken, N.J.) is offering a new line of pulverizers and granulators that operate on the jet-shear-impact principle and feature precise size control and quiet operation. The line has three basic units —a mill, a pulverizer and a flaker or chipper. These units granulate, flake, chip, mix, disperse with rotary impellers, baffle plates and cutting edges rather than screens.

•

Storage Batteries: The Electric Storage Battery Co.'s Exide Industrial Division (Rising Sun and Adams Avenues, Philadelphia 20) is out with a new storage battery for stationary service said to boost electrical power by 66% over flat-plate batteries. The new design is similar to that now in use in industrial trucks, railway locomotives and ships. Exide says it can save up to 64% of the floor space and 55% in weight over conventional batteries. Estimated life: 20 years.

•

Laboratory Analyzer: Technicon Controls, Inc. (Research Park, Chauncey, N.Y.) has developed a two-speed proportioning pump and a sampler of greater capacity that extends the scope of its AutoAnalyzer (*CW, Aug. 9, '58, p. 66*) to many new control laboratory procedures. The new units cut down the setup time to as little as one minute between numerous repetitive tests that are run in series. This makes practical daily runs of 10-12 different types of analyses on the same equipment, Technicon says.

•

Air Compressor: Worthington Corp. (Harrison, N.J.) says its new four-stage integral-gear centrifugal air compressor is the most efficient ever offered in this country. The integral gear permits direct coupling to a low-speed motor driver, eliminates a high-speed coupling. Units are available with 4,000- to 30,000-cfm. air-inlet capacities and 60- to 105-psi. discharge pressures.

•

Pipe Insulation: Rigid, foamed plastic that can be used as a load-bearing insulation at pipe-hanger locations is a new development of Armstrong Cork Co.'s Insulation Division (Lancaster, Pa.). Called Rigid Armaflex, the new insulation has physical properties similar to Armaflex 22 flexible pipe covering. It is impervious to moisture, is self-extinguishing when subjected to flame, resists ozone and can be used at temperatures of below 0 to 220 F.

•

Ball Valve: A new ball valve that simplifies in-line maintenance is available from Lunkenheimer Co. (Cincinnati). The valve, called Fig. 700, has a removable cover that exposes the top of the ball, which can be removed with a tool on the valve's especially designed handle. The ball is flat on top and bottom for easy removal. The valve has screw ends, is offered with a bronze body in ¼- to 2-in. sizes.

•

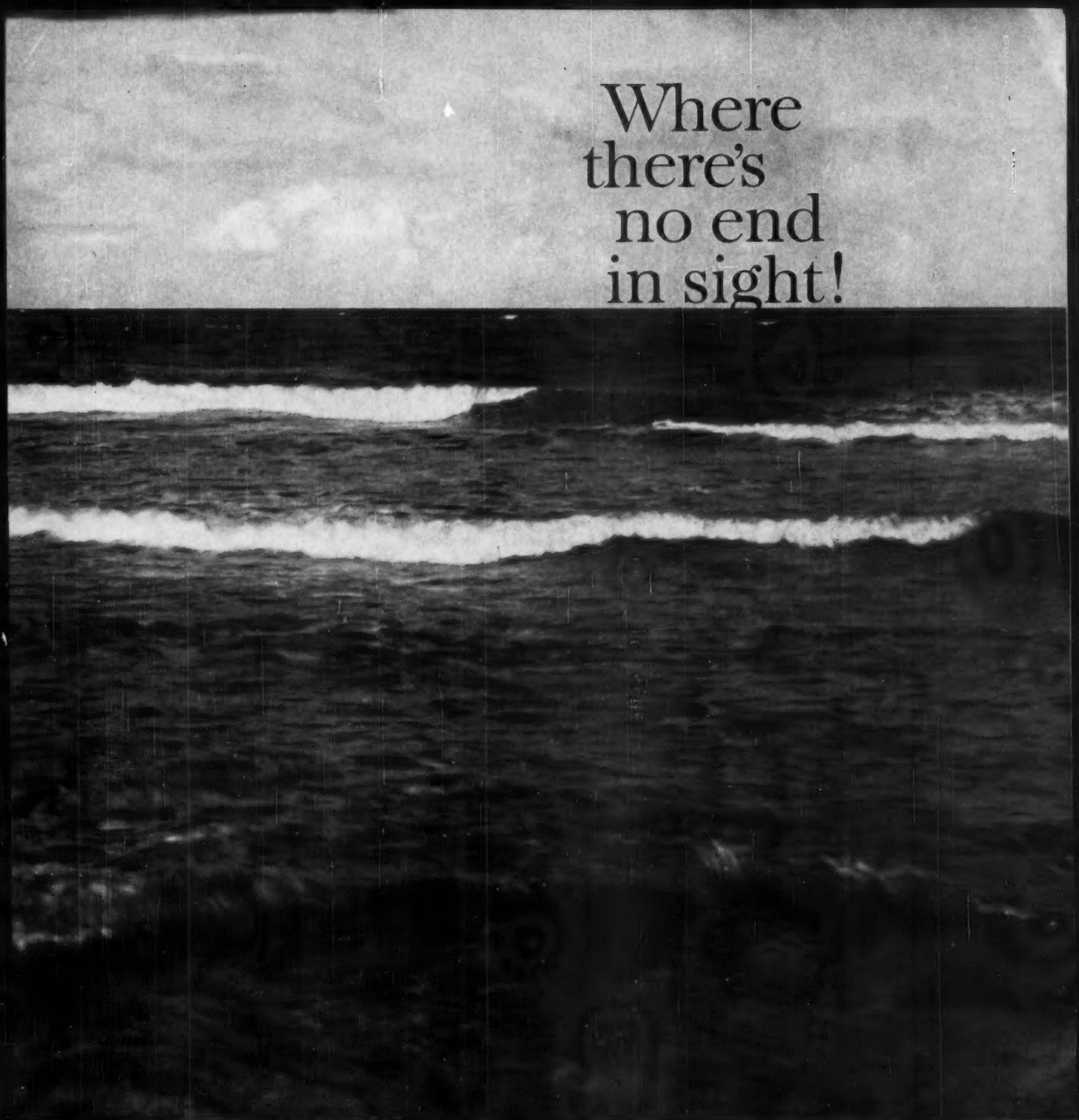
Vacuum Cleaner: A portable vacuum cleaner that will collect radioactive and toxic dusts is a new product of Cambridge Filter Corp. (738 East Erie Blvd., Syracuse 1, N.Y.). The unit has a filter for collecting 0.3-micron dust particles with minimum efficiency of 99.97%. The vacuum cleaner's flow rate is 154 cfm. of air.

•

Wire Cloth: The Cambridge Wire Cloth Co. (Cambridge, Md.) is now coating industrial wire cloth with Teflon. The coating can be applied evenly over the entire surface of cloth as fine as 180 mesh, according to Cambridge. Suggested uses: filtration of liquids containing water. The Teflon coating holds back the water, permits other liquids to pass through.

•

Weld Stress-Relieving: Welds on small-diameter pipes and tubes can now be stress-relieved with a new clamp-on resistance heater developed by Electric Arc, Inc. (152 Jelliff Ave., Newark 8, N.J.). Model NV-C can be operated on low-voltage on pipes and tubes with 2- to 6-in. outside diameters and ⅜-in. maximum wall thickness. The unit was used at Consolidated Edison Co.'s (New York) Indian Point atomic power plant with a Smith-Dolan 60-cycle heater with control switches permitting six or more welds to be stress-relieved simultaneously. Model 712 operates from a 220-volt source, will stress-relieve six welds simultaneously on 1- to 2¾-in. OD. pipe. The units can treat welds at temperatures to 1375 F.



Limitless . . . the opportunities for discovery, invention, improvement. That's the thinking behind Conoco chemicals . . . making them superior in every way!

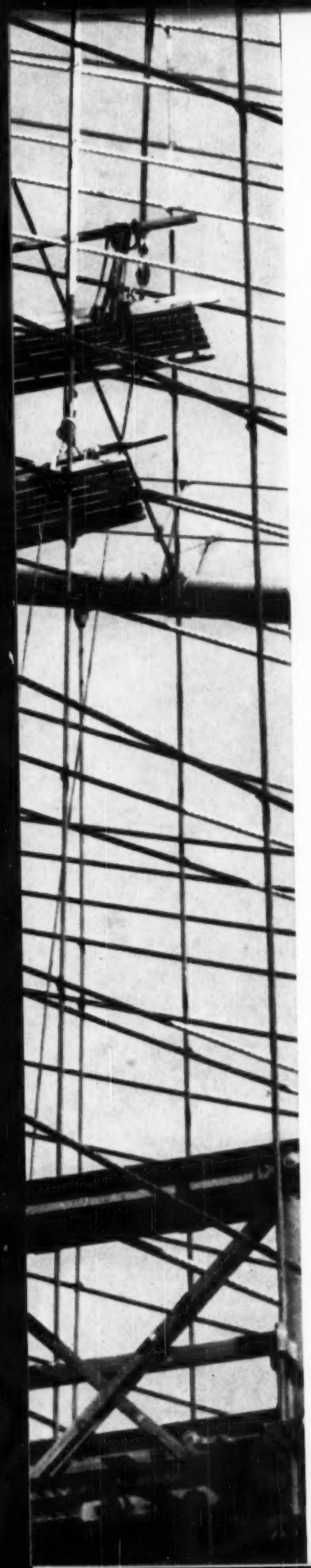
Today, more and more manufacturers are relying on Conoco for a diversity of fine chemicals. Included in the Conoco line are anionic and cationic detergent intermediates, water-soluble sulfonates, oil-soluble sulfonates, petrolatums, white oils, secondary plasticizers for vinyl resins, fluid-loss additives, viscosity depressant, and ethylene oxide.

For chemicals with a head start on the future, count on Conoco!

CONTINENTAL OIL COMPANY, PETROCHEMICAL DEPARTMENT
1270 AVENUE OF THE AMERICAS, NEW YORK 20, N.Y.

CONOCO

©1959, Continental Oil Company



Start with
Monsanto

ACRYLONITRILE

FOR SURFACE COATINGS—with tough resistance to moisture, solvents, chemicals, marring, bacteria, and fungus. Acrylonitrile increases rapid air drying, adhesion, strength, and weathering performance in coatings for a wide range of surfaces.

Acrylonitrile can be incorporated into solvent systems through reaction with alkyd resins, or into latex systems by reaction with other monomers in an aqueous medium to produce surface coatings with many advantageous properties. Systems have been devised with acrylonitrile for coating wood, metals, masonry, textiles, paper, glass, plastics, rubber, and leather.

Also a popular raw material in plastics, adhesives, rubber, and textiles, acrylonitrile can contribute valuable properties to many polymeric materials, thanks to its highly polar nitrile group and reactive double bond.

Acrylonitrile can be polymerized to form emulsions, suspensions, solutions, or solids. It can be copolymerized with butadiene, styrene, vinyl chloride and other highly active monomers. It readily undergoes addition polymerization to form high molecular weight products. Its nitrile group can be converted into acid, ester, amide, or amine.

Monsanto, world's largest producer of acrylonitrile, has prepared a concise, easy-to-read brochure, which details application, reaction, testing and handling data on this versatile monomer. Send coupon below for your free copy. Monsanto Chemical Company, Plastics Division, Springfield 2, Massachusetts.

MONSANTO INITIATOR IN **PLASTICS**

Monsanto

Monsanto is also a leading producer of styrene monomer, vinyl chloride monomer, and methanol.

ACRYLONITRILE APPLICATION RESEARCH SERVICE

Monsanto Chemical Company, Plastics Division
Room 775, Springfield 2, Massachusetts

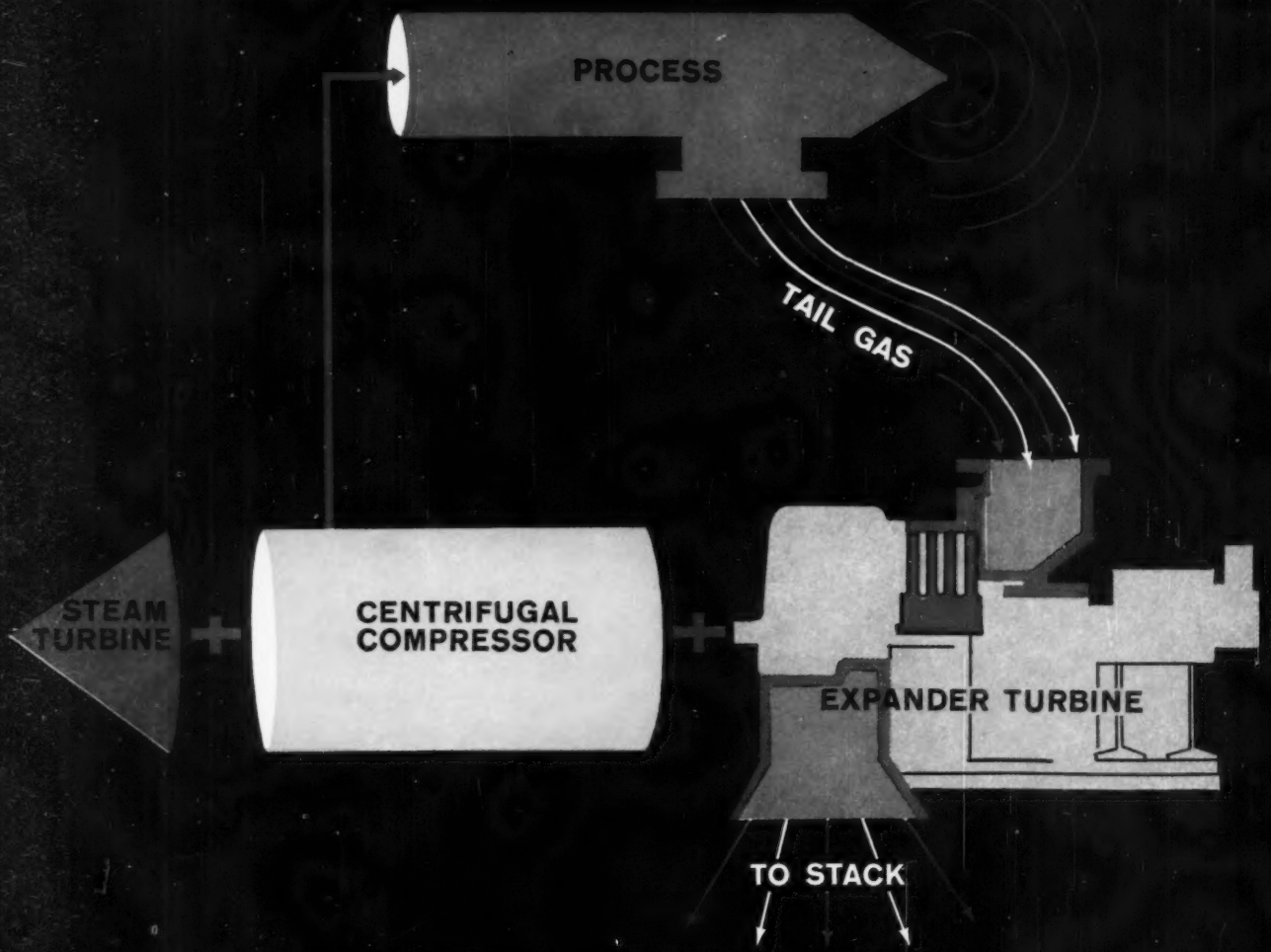
Please send me new brochure on MONSANTO ACRYLONITRILE.

Name_____ **Title**_____

Company_____

Address_____

City & State_____



TAIL GAS WAGS PROCESS, SAVES ⅔'s POWER COSTS

In less serious moments we call it "tail-wagging." Actually, it's the art of taking substantial amounts of power from process exhaust or "tail" gases. By making the tail wag the dog . . . putting this power back into the process . . . major increases in efficiency can be obtained.

The key machine is the turbine gas expander that returns power to the process by serving as a prime mover. In one process, for example, a centrifugal compressor delivers air to the process. After reaction, in which the oxygen is removed, the residue or "tail" gas leaves the process at extremely high temperatures and under pressure. Passed through a turbine expander, this gas does useful work.

This work can be applied to driving generators, blowers or geared to reciprocating equipment. If used driving a centrifugal compressor, it can supply as high as 85% of the driving power. An auxiliary motor or steam turbine can provide the make-up and start-up power.

Recent developments in design, materials and manufacture have now made "tail-wagging" with high horsepower, high temperature turbine gas expanders possible for a variety of processes. At Worthington we have answers you need to make a complete study of this new opportunity for process plant economy. For information about "tail-wagging" (turbine gas expanders and their application) please write Worthington Corporation, Expander Section (48-10), Wellsville, New York.

WORTHINGTON

Technology
Newsletter

CHEMICAL WEEK
October 15, 1960

A digital computer (IBM 704) has been diverted from part of its scientific work to control the world's largest petroleum distillation unit, Standard of Indiana's Whiting, Ind., crude still. First IBM computer doing process control work, this installation opens the door for using general-purpose computers in operating control.

•

An improved phosphor for TV picture tubes resists contamination (e.g., by iron and copper) during tube manufacture, has better adhesion characteristics than do conventional phosphors, and resists ion burn, which may form a spot on the face of the picture tube as a result of focusing of electrons on a small screen area as the set is turned on and off.

Like a conventional phosphor, the improved version (called CR407) consists of zinc sulfide and zinc cadmium sulfide and costs the same—about $10/lb. But its developer, Sylvania Electric Products, Inc., tells CHEMICAL WEEK that changes in phosphor production (e.g., in firing) change the particle shape, providing the key to better performance.

•

Blast furnaces, which have already proved themselves a growing customer for fuel gas (*CW, April 23, p. 53*), are showing that they can use fuel oil also. Key: a special injection system (developed by Esso Research and Engineering Co.), which has been designed into a new, $10-million blast furnace recently completed by Dominion Foundries & Oil Co., Ltd. (Hamilton, Ont.). The effect of fuel oil injection is reported similar to that of fuel gas. It should thus cut coke consumption about 12% and increase furnace capacity about 15%, while opening up a market with a total possible consumption of about 12-14 million tons/year.

•

A new chemical technique for determining sensitivity of individuals to drugs was disclosed this week by Dr. Ernest Beutler of the City of Hope Medical Center (Duarte, Calif.). It may help speed commercialization of new drugs that are effective for the majority of users but are withheld from markets because of occasional adverse reaction to them.

The method, revealed at the Symposium on Genetic Control of Biochemical Processes in Diseases of Metabolism (in St. Louis), requires testing a small sample of blood for stability to glutathione. When drug-sensitive red cells are incubated with a reducing agent such as acetylphenylhydrazine, glutathione in the cells is destroyed. There is no glutathione destruction in nonsensitive red cells.

•

Sugar cane can now be processed by extracting the juices directly from the cane instead of by conventional crushing methods. The process, said to use a diffuser to extract the sugar with warm water, was developed by the Hawaiian Sugar Planters Assn. in cooperation with Silver Engineering Works (Denver), Reitz Manufacturing Co. (Santa Rosa, Calif.) and

French Oil Mill Machinery Co. (Piqua, O.). A pilot plant turned out over 23,000 tons of sugar between March '59, and last August.

Investment costs are greatly reduced. Silver Engineering has entered firm bids of $200/daily ton of cane for constructing the new units. When associated equipment is added, this brings the total investment to about $400/daily ton, compared with $500/daily ton for conventional milling machinery. Since operating costs are also reduced, the new process is expected to replace conventional mills in nearly all new construction, although it is not expected to justify scrapping currently operating mills.

•

A "drycleaning" project for secondary recovery of crude oil from the Sub-Clarksville reservoir in Texas' Neches Field will use over 2 million bbls. of propane-rich liquefied petroleum gas worth about $4.5 million.

When mixed with water and injected into the reservoir, the liquefied propane gas is expected to wash about twice as much oil out of reservoir sands as could be recovered by conventional water flooding.

If approval is granted by the royalty owners and the Railroad Commission, the injections will begin early in '61, are expected to bring the reservoir to a production of 3,000 bbls./day during the next several years.

•

A means of containing gaseous fission products, one of the principal problems of high-temperature nuclear reactors, has been developed by researchers at Battelle Memorial Institute (Columbus, O.). They have worked out a technique for coating fuel particles (of about 0.001 in. diameter) with impermeable ceramics such as alumina and pyrolitic graphite. Key is a fluidized-bed system in which layers are deposited on the particles at about 1800 F (for alumina) and 2400 F (for pyrolitic carbon).

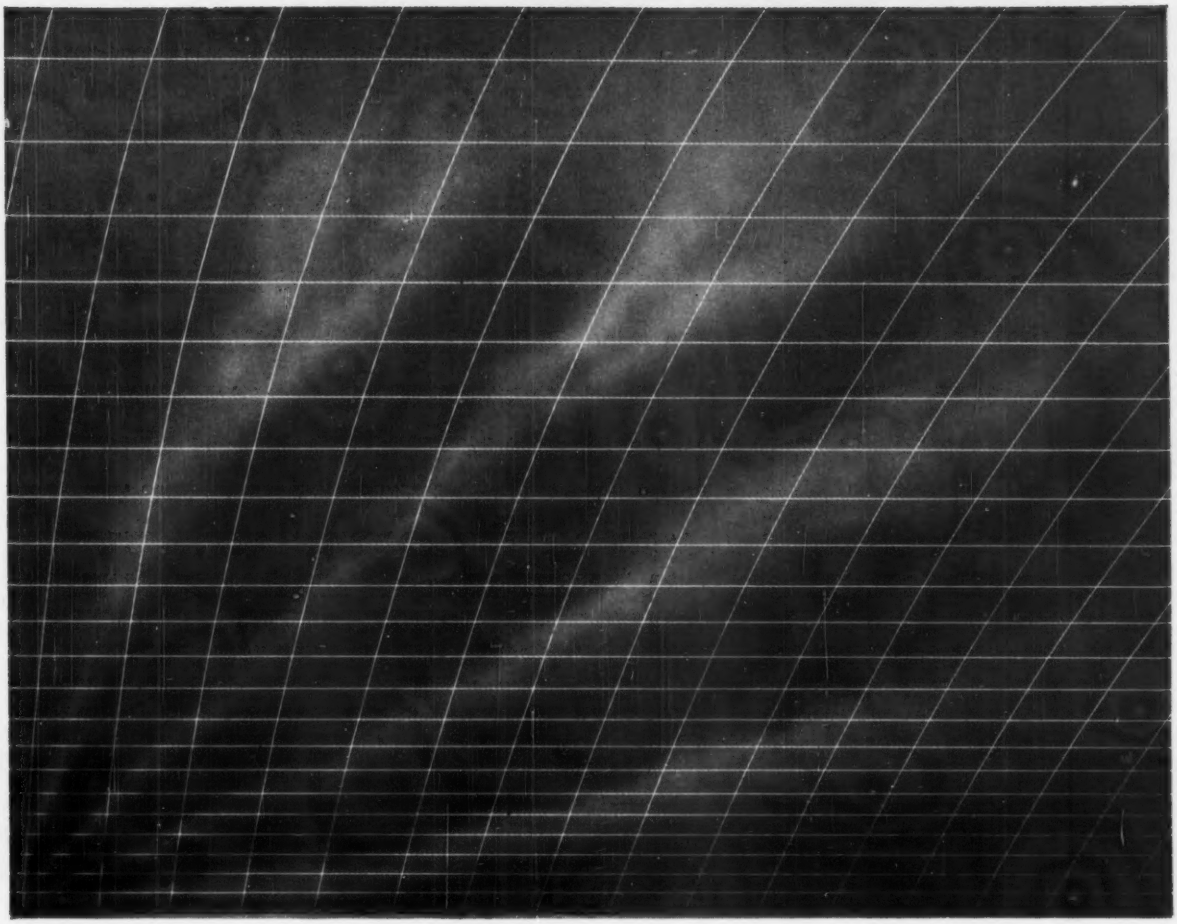
About 500,000 of these coated particles are then encased in 1.5-in.-diameter graphite spheres, which are used in pebble-bed reactors such as that being developed for AEC by Sanderson and Porter, Inc.

Exploratory work at Battelle indicates that such a system will be serviceable at bed temperatures of 2300 F and possibly up to 2500 F when uranium oxide particles are coated with alumina. Tests haven't been completed, but uranium carbide particles covered with pyrolitic carbon and contained in graphite spheres may be good for bed temperatures upward of 3000 F.

•

Coal is threatening increased competition for chemical markets. Weapon: a continuous coke oven developed by Salem-Brosius, Inc. (Carnegie, Pa.) for New York Mining Co. The new oven uses a moving hearth, rotating slowly through a "doughnut." It produces metallurgical coke with increased yields of by-products. Investment costs, operating costs and space requirements are said to be greatly reduced. A prototype oven to test various coals will start up at Dorchester, Va., in mid-December.

With a variety of evaporation rates...



SHELL AROMATIC SOLVENTS

SHELL TOLUENE . . . for applications where very fast evaporation and high solvency are required.

SHELL XYLENE . . . has an exceptionally narrow distillation range, is slower drying than toluene.

SHELL CYCLO-SOL® 53 . . . an excellent solvent with higher flash point and slower evaporation rate than xylene. Recommended for baking finishes and flow coating.

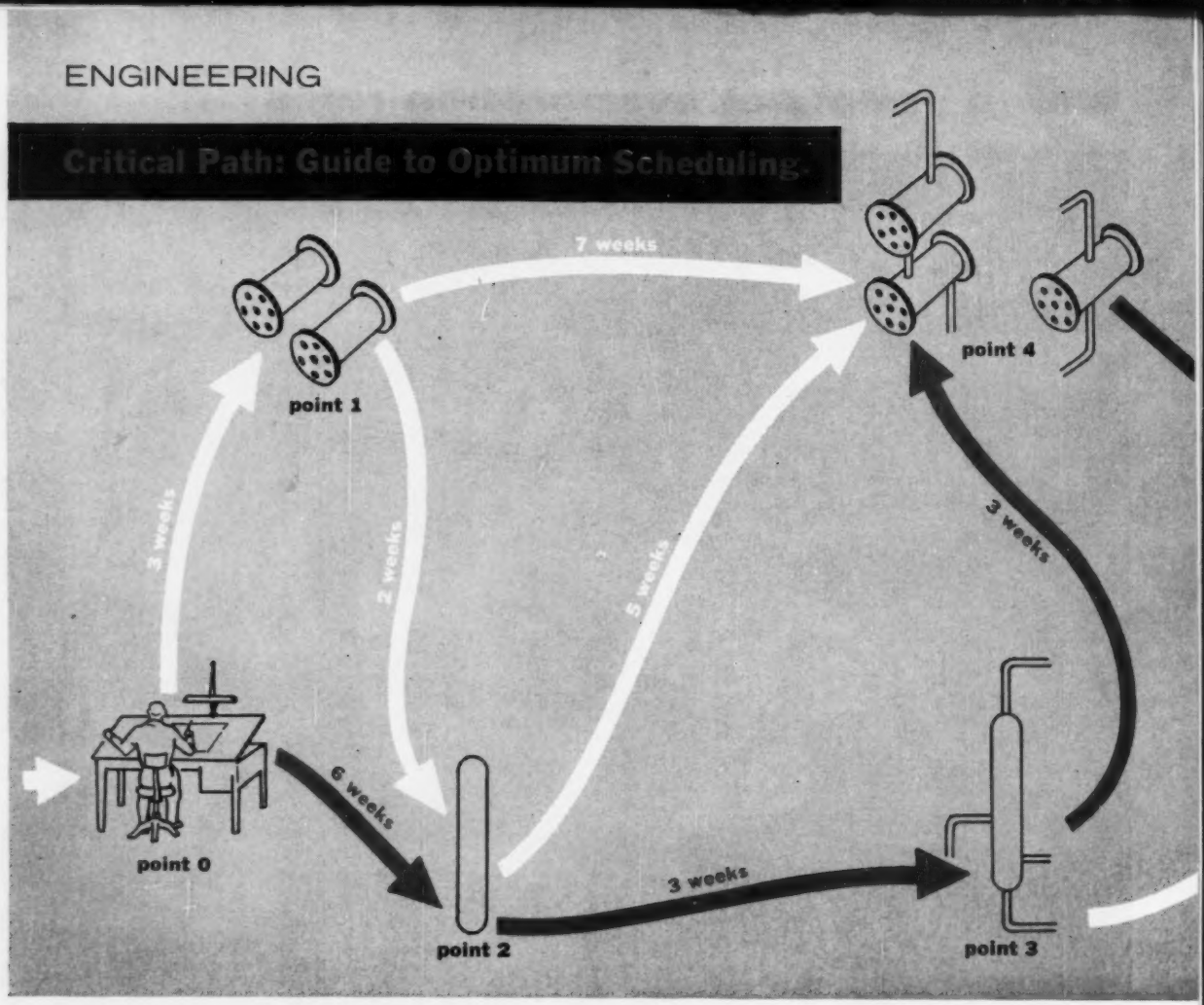
SHELL TS-28 SOLVENT . . . a still slower drying aromatic concentrate of medium high solvency. Recommended for baking finishes and flow coating.

Typical properties are given in the booklet shown. Write for a copy.

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL



Space-Age Scheduling Arrives

When the Polaris missile goes operational this month a technique known as "critical path scheduling" can be credited with help in bringing it to the U.S. Navy two years ahead of early estimates. The same technique hastened completion of Allied Chemical's Frankford, Pa., phenol plant that went into operation last month. In short, CPS, an offshoot of operations research and systems engineering, is growing into one of the most useful engineering tools to come to the chemical process industries since the end of World War II.

Since its concept of critical sequence of operations is adaptable to all types of research, engineering design and construction projects, it is useful to all industry. But it is particularly useful to the expansion-minded CPI; within five to seven years it may well be used on $1 billion/year worth of new projects.

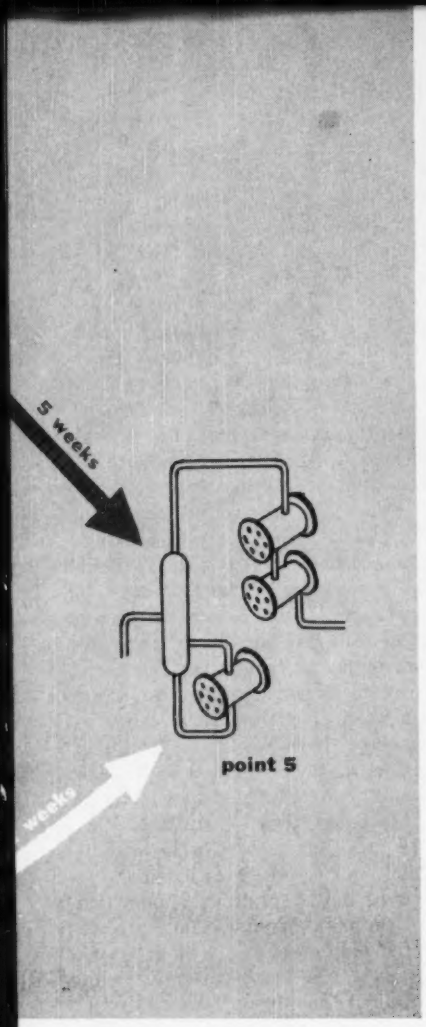
Already the CPI is in the van of those using critical path scheduling. Soon after the Polaris program stirred widespread interest in CPS, Du Pont devised a program called "arrow diagraming." It has been used in expansion projects at eight Du Pont plants with great success, primarily to keep design and construction projects at minimum cost.

Carrying arrow diagraming forward after work by Du Pont and the Navy, Catalytic Construction Co. (Philadelphia) has adopted it to engineering design and construction projects and even regular plant maintenance; it is now the foremost exponent of critical path techniques among U.S. engineering contractors. CCC has been employing it for a year, uses it to control all of its projects. On Sept. 16, it completed the $5-10-million phenol plant for Allied Chemical, using CPS to control this project to the day on a tight 10-month schedule.

Besides this, CCC has used critical path scheduling on three other recently completed plants and is employing it on 10 current projects, including Pennsalt's $1.5-million alkyl alkanol amines plant at Wyandotte, Mich., Monsanto's Anniston, Tex., insecticides plant, and two missile installations. Last week CHEMICAL WEEK went to CCC, got full details on how it has put critical path scheduling into practice.

Logical Approach: There is nothing magic or exotic about critical path scheduling. It is simply an "artificial" method of thinking through a project in advance, with step-by-step logic. At CCC it's done in three distinct operations:

(1) All conceivable operations that will be performed on a coming project are forecast. Each one operation



in CPI

is named, drawn with an arrow on a giant sheet of paper. These arrows are connected head to tail, in their logical sequence, forming an "arrow diagram." If, for example three operations start the project, they are given separate, parallel arrows and joined only where their completion is needed to start a subsequent step. The arrows are never drawn to scale, and it is always assumed that following steps begin with no delay after preceding steps are finished.

(2) Time required for each operation is estimated and listed (but it does not affect line length). When this required time is inflexible—as for material deliveries (*CW, Sept. 3, '60, p. 32*) or for contracted schedules—no further estimating is required. When the time can be varied by assigning more or less manpower to the operation—as in detailed design work, drafting and construction—al-

How to Find the Critical Path

Construct a worktime matrix: List starting points down the left side, ending points across the top. Fill in: 6 weeks for starting point 0 and end point 2; 7 weeks for point 1 to point 4. Complete with all nine time periods.

Worktime Matrix

starting point \ finishing point	1	2	3	4	5
0	3	6			
1		2		7	
2			3	5	
3				3	7
4					5

	Point	EST
7+3= 10	1	3
5+6= 11	2	6
3+9= 12	3	9
	4	12
	5	17

Calculate earliest starting times (EST): At end point 1, go down to 3, left to 0. Put 3 in table. Then, at end point 2, go down to 6, over to 0, remember 6. Again, at end point 2, go down to 2 weeks, over to 1, read the 3 at point 1 in the table and add this 3 to 2 weeks to get 5. Since 6 is *higher* than 5, put 6 in table. Continue.

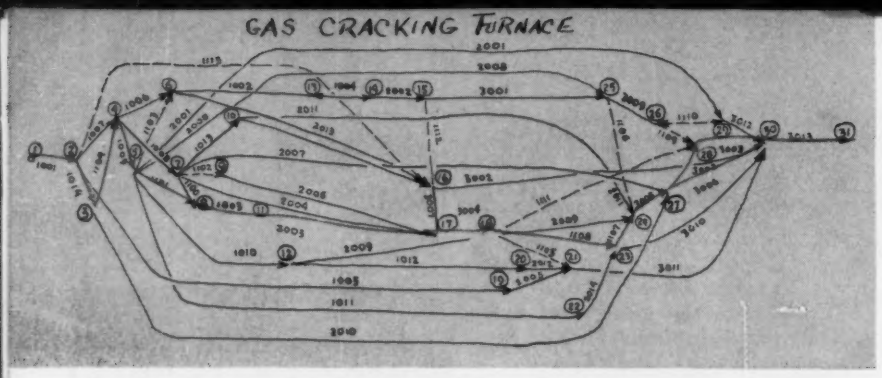
Calculate latest finishing times (LFT): At final point, EST = LFT, so put 17 for point 5. Go to starting point 4, read across and then up; take 5 weeks, subtract from the LFT for end point 5, which is 17, and fill in 12. Now go to starting point 3, across to 3 weeks, up to end point 4. Subtracting 3 weeks from the LFT for 4 (12) equals 9. Remember 9. Again at starting point 3, go across to 7 and up to 5; subtract 7 weeks from LFT for 5 (17) and get 10. Since 9 is *less* than 10, put 9 in table. Continue.

Point	LFT
5	17
4	12
3	9
2	6
1	4

Operation		Worktime	Earliest		Latest		Float
from	to		EST	EFT	LST	LFT	
0	1	3	0	3	1	4	1
0	2	6	0	6	0	6	0
1	2	2	3	5	4	6	1
1	4	7	3	10	5	12	2
2	3	3	6	9	6	9	0
2	4	5	6	11	7	12	1
3	4	3	9	12	9	12	0
3	5	7	9	16	10	17	1
4	5	5	12	17	12	17	0

on critical path

Construct critical path table: List all time periods, operations and the corresponding EST and LFT. Add time period to EST for EFT (earliest finishing time); subtract time period from LFT for LST (latest starting time). When EFT equals LFT, the point is on the critical path.



Actual arrow diagram drawn for furnace by CCC project manager.

ternate times are estimated for the operation, along with costs for each time.

(3) Once the time (or times) have been set, the arrow diagram is solved. Solution means finding not the shortest, but the longest, sequence of operations. This arrow sequence is the "critical path" because it points up (a) the time the project will need and (b) the steps that must be watched if the project is to be finished more quickly or cheaply—in short, the critical steps. Minor project arrow diagrams can be solved by hand; complicated ones require the use of computers and a mathematical technique called triangular matrixes.

Easier Said . . . : In spite of the seeming straightforwardness of this approach, CCC has found that critical path scheduling is rarely easy to put into effect. First hurdle is the arrow diagram. It takes a project manager with thorough knowledge of his field to forecast, stepwise, each operation in a coming project. And it can be done only by one man working alone, although he will consult the process engineers, design engineers, purchasing agents and the construction superintendent before he is finished. At CCC this job is done by the project manager, who will see the project through to its completion. He will put down the 25-50 steps typical of a fairly simple job, in the order in which they are to be done.

In a hypothetical case his first steps might be (1) process design and flow diagram preparation, (2) preparation of engineering flow diagrams and plot plans, (3) vessel designs, (4) specification of mechanical equipment (5) specification of instruments, (6) piping specifications.

Then would come the step-by-step design of electrical switchgear, detailed plot plans, foundation and steel designs, checking of designs—everything up to starting construction. Then would be detailed stepwise "arrowing" for the next 15-20 stages up to plant completion.

All of these phases are accomplished in several operations and an arrow for each drawn on the diagram. Such diagrams are more than mural-size. At CCC the arrow diagram for a multimillion-dollar expansion project was unrolled by Walt Cosinuke, father of critical path scheduling* at CCC and assistant to the president. Drawn freehand, it was as wide as an office desk, and some 20 ft. long. Cosinuke put in 85 hours of concentrated work developing it.

Selection for Accuracy: Once the arrow diagram is complete, it is sent to estimators who calculate the time for each operation. And here, clearly, an immediate weakness of CPS can be seen: it can be no more accurate than the admittedly fallible estimates of step time. And it uses the same estimating procedures as other systems. Why, then, can management expect more accuracy?

"Because each time guess is re-estimated, refined," answers Cosinuke. Although the quick estimates applied to an arrow diagram may be off by 20%, this has been proved to be close enough to eliminate danger of confusing the critical path with the other job sequences. Once the CPS is determined, the arrow chart can be sent back to the estimators for exact calculation of the critical steps. There is no time wasted in carefully estimating every step—vital or not—in an entire project.

Also this permits accurate estimation of the variation of cost versus time allowed. Whenever it is possible to schedule a project for an over-all optimum cost instead of to fixed time limit, a variety of operating times, along with the estimated cost of each, is prepared for each step on the critical path. These are then fed to a computer with the investor's estimate of increased overhead versus delay in the over-all project. By trial and error, the computer is able to find the optimum point between the minimum construction costs and minimum overhead costs.

Picking Your Profit: As an example of the attractiveness of this type of scheduling, Cosinuke cited a petroleum specialties plant recently completed in Texas. Halfway through the project the client's sales department discovered their potential markets were much better than predicted. It asked CCC if it could complete the project earlier than planned. CCC was not only able to offer to finish the project earlier, but was able to present a list of earlier completion dates with the variation in construction costs for each date. The client balanced increased construction costs against possible sales and chose to complete four weeks earlier. This revised schedule was met to the day —and at the predicted cost increase.

Maximum from Manpower: This type of scheduling also brings a completely new approach to handling the tens of thousands of man-hours that go into a construction project. "The old S curve is out," says Cosinuke. (He refers to the graph of "required man-hours" vs. "percent completion" as needed in conventional project scheduling; it vaguely resembles a reclining letter S.)

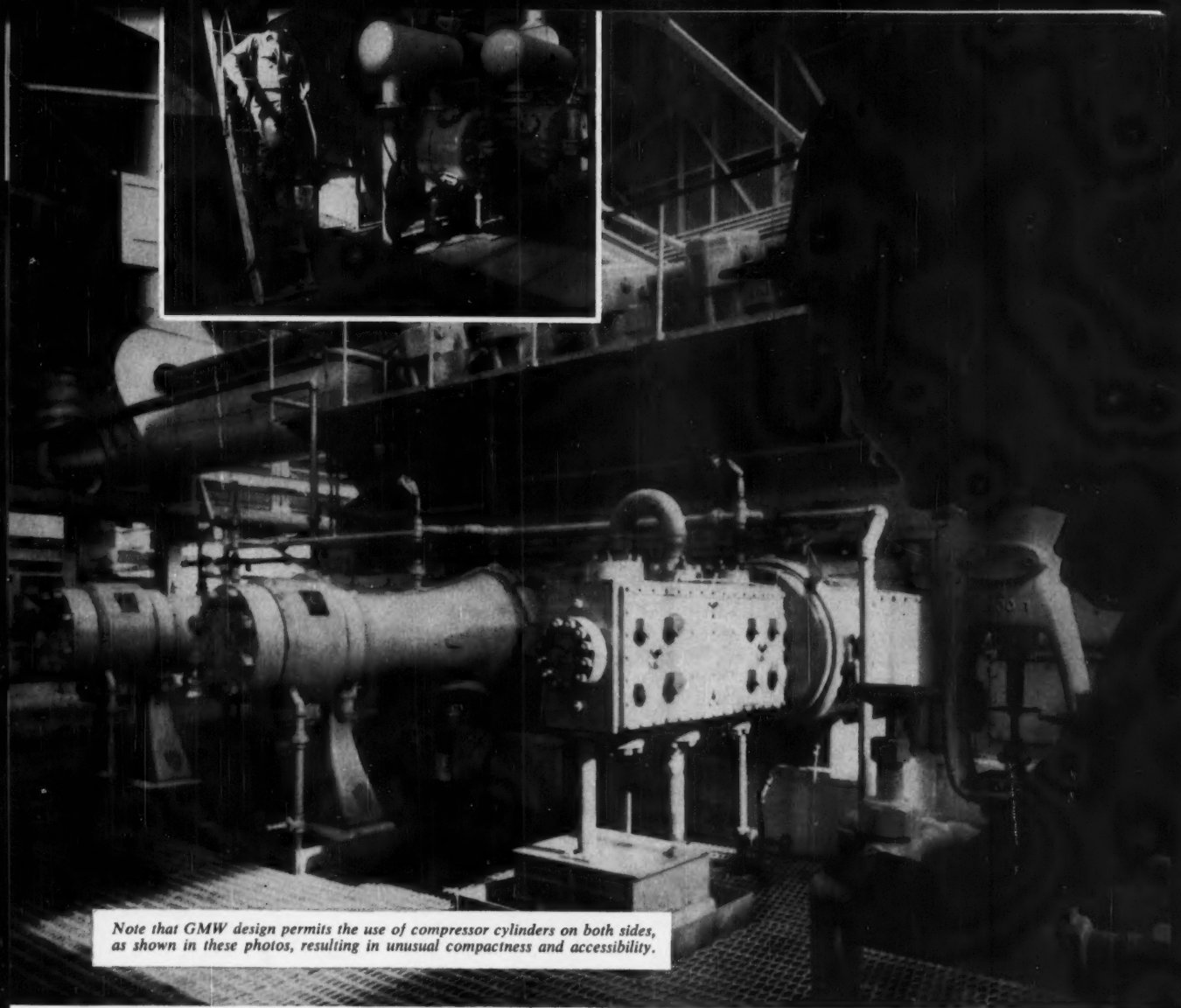
And with disappearance of the S curve, he says, comes increased efficiency. The critical path permits construction superintendents to throw the optimum number of men onto a project and keep them there until one or two weeks before completion. When they followed the S curve, superintendents allowed the manpower load to pass through a peak, and began layoffs when the project was about 60% complete. The trouble is that as soon as the layoffs begin the morale and efficiency of the rest of the workers plummets.

Computer Food: Following development of the arrow diagram and time estimates, the computer calculations move through four phases:

(1) The steps on the arrow diagram, along with their corresponding series of times and costs, are run through the computer to make matrix files resembling the square at the top of the table on p. 75.

(2) The matrix files are run through

*Complete details of a critical path scheduling technique almost identical to CCC's can be obtained from Mauchley Associates (Ambler, Pa.).



Note that GMW design permits the use of compressor cylinders on both sides, as shown in these photos, resulting in unusual compactness and accessibility.

Report from American Cyanamid, Fortier Plant...

How Cooper-Bessemer gas engine compressors boost synthesis gas for ammonia to 5000 psi

These photos show both sides of one of the two Cooper-Bessemer 2500 hp GMW gas engine compressors at the Fortier Plant of American Cyanamid Company, Avondale, Louisiana. In the production of anhydrous ammonia, these 4-stage units compress 6000 cfm of synthesis gas from 60 psi to a discharge of 5000 psi. The lower view shows the high pressure cylinders; that in the inset shows the low pressure side. The four stages of compression from 60 psi are (1) to 225 psi, (2) to 670 psi, (3) to 1500 psi, (4) to 5000 psi.

The two units have been operating since 1954, 24 hours a day, 340 days a year.

The anhydrous ammonia produced at the Fortier Plant is used by American Cyanamid in the manufacture of acrylonitrile and is sold to fertilizer plants and other chemical companies.

Find out how Cooper-Bessemer can help *you* plan compression and power facilities. Call the nearest office.

BRANCH OFFICES: Grove City • New York • Washington Gloucester • Pittsburgh • Chicago • Minneapolis • St. Louis • Kansas City • Tulsa • New Orleans • Shreveport • Houston • Greggton • Dallas Odessa • Pampa • Casper • Seattle • San Francisco • Los Angeles

SUBSIDIARIES: Cooper-Bessemer of Canada, Ltd.... Edmonton Calgary • Toronto • Halifax • Stratford

C-B Southern, Inc.... Houston

Cooper-Bessemer International Corp.... New York • Caracas • Anaco

Cooper-Bessemer, S.A.... Chur, Switzerland • The Hague, Netherlands Mexico City

The Rotor Tool Company... Cleveland

Cooper Bessemer

GENERAL OFFICES: MOUNT VERNON, OHIO

ENGINES: GAS • DIESEL • GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL
ENGINE, TURBINE OR MOTOR DRIVEN

For on-the-line package weight control — W-C CHECK-WEIGHING SYSTEMS

Whatever your requirements for production check-weighing of packaged materials, W-C can supply a job-engineered system to meet them. Systems can be automatic or manual; can weigh in motion or stop-and-go; can segregate packages according to specific zones of under- or overweight, or according to a single pre-selected tolerance. They can provide practically any type of readout you want, and can be readily integrated with tape-fed, punched-card and other types of data handling systems.

Surprisingly, such job-engineered systems can be delivered at a most realistic cost—probably less than you'd expect. The reason why is a simple one: pre-engineered components, unitized design. There is no speculation or experimentation; W-C systems are designed on the very practical basis of service-proven, standardized components.

Typical applications include: Checking weight of tire treads as extruded . . . checking container weights after automatic filling . . . checking multi-unit package weights.

Write for new Bulletin 50

W&C WEIGHING & CONTROLS, INC.
Div. of CompuDyne Corp.

E. County Line Road • Hatboro 15, Pa.
P.A. 2124

to give total project duration along with the corresponding time for each step. The computer gives a series of total durations, varying between two limits.

(3) Some of the total durations are selected, combined with cost data, then run through the computer for total cost. This gives a series called Basic Reports, each report resembling the table at the bottom on p. 75.

(4) A curve of time versus operating cost is constructed by hand from the Basic Report. When combined with a curve of overhead versus time, these show the optimum time schedule for the project. The critical path is then read from the Basic Report for this schedule.

With its history of successes it may seem odd that critical path scheduling is not being utilized more by engineering management. They've likely been scared off by the arrow diagram. This is a one-man job; the diagram must be laboriously worked out with pencil and drawing paper. Even for an experienced man, this takes one to three weeks' work.

Admittedly, most major builders have the men with necessary experience. But each has become a well-paid management man earning $12,000-20,000/year and likely has developed the habit of delegating exactly the sort of detailed work arrow diagraming needs. He will probably be slow to assume such a task as the arrow diagram, and his boss will hesitate forcing him into it.

Since the critical path concept is not easy to grasp (the information presented here is a bare outline; indoctrination courses take several weeks of long study), most firms stick to tried-and-true methods: the project manager assigns scheduling to people who can put it into a conventional bar chart where everything is followed in parallel. Then the project manager uses the bar chart to run the project by "the seat of his pants," moving from problem to problem (or from crisis to crisis) as they arise.

Cosinuke feels that no firm needs to pay the price of such systems. He has some convincing evidence from his own company, adds in the favorable experiences of Du Pont and the Navy to bolster his case. But it will still be up to each company to decide whether the game is worth the candle.

Sixth for Desalting

A sixth freezing process has entered the race for sea-water desalinification. Applied Science Laboratories, Inc. (State College, Pa.), has come out with a flash-freezing process calculated to produce sweet water at 40-70¢/1,000 gal. This compares with an estimated $1-2 for distillation processes and 50¢ and up for other freezing processes.

Competitors are Carrier Corp.'s flash freezing, Blaw Knox-Cornell University's flash freezing, Fairbanks, Morse & Co.'s vacuum vaporization, and Battelle's zone freezing (*CW, June 11, p. 85*). The ASL process claims advantages over these with a regenerative system that avoids liquids-solids handling through in-place regeneration. Three tanks operating in parallel alternately freeze water, wash, then melt the pure ice. Vaporizing isobutane is used to provide refrigeration. Heat economy is obtained by condensing the compressed isobutane gases against the melting ice in the tank under regeneration.

Cheaper U.S. Chromite?

New flotation methods to recover chromite from American ores — in which the chromite is fine-grained and dispersed—have proved out well in tests at U.S. Bureau of Mines laboratories. USBM says its work with ores from the U.S. Northwest (including some from the Nye, Mont., Mouat Mine chromite deposit—part of the largest chromite deposits in the U.S.) shows it may be possible to use American ores as economically as currently favored imported ores.

The flotation techniques center about reagents (e.g., organic amines and fuel oil) that adhere to chromite particle surfaces and air-bubble injection to make these particles float (*CW, Sept. 24, p. 75*). Details are in "Flotation of Pacific Northwest Chromite Ores," based on studies at USBM's Albany, Ore., Metallurgy Research Center; copies are available from the bureau's Pittsburgh offices.

Need to Concentrate: Aim of the flotation tests was to upgrade Western ore enough to make it attractive to U.S. chromium producers, most of which are in the Eastern part of the U.S. Now these chromium producers find it far cheaper to import African

Designed for confidence

Picco Resins

You can specify Picco Resins with absolute confidence in the high quality of these fine hydrocarbon products. Carefully manufactured under rigidly controlled conditions in large quantities, their consistent uniformity assures trouble-free operation. Picco Resins are neutral thermoplastics, and are resistant to alkalies, salts and dilute acids. Their wide spectrum of utility is accentuated by stability and inertness.

The trademark of quality

PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION
CLAIRTON, PENNSYLVANIA

In Automobiles, Rubber Products and Toys—You'll Find

WITCO CHEMICALS AT WORK

AN EXTRA MARGIN OF DRIVING SAFETY AND COMFORT comes from dashboard panel crash pads and seat and arm rest padding made of flexible urethane foams prepared with Witco's Fomrez® Resins. These resins impart to the finished foam excellent physical and aging properties for tireless performance. And flexible foams made with Fomrez Resins resist chemicals and solvents... are ideal for clothing interlining – furniture and mattress cushioning. Witco Fomrez Resins for the manufacture of rigid foams, applied as insulation – structural reinforcement – potting and for flotation are also available. Whether you are interested in flexible or rigid urethane foams, there's a Witco Fomrez Resin of uniform quality and good handling and processing characteristics to fill the bill.

DURABLE PLASTIC DOLLS FOR LITTLE MISSES are made with the aid of Witco metallic stearates. Zinc stearate, incorporated into molding compounds or dusted onto mold surfaces, lubricates... minimizes ejection pressures, thereby eliminating breakage in the finished product. Other stearates produce firm stable gels with many hydrocarbon solvents. Witco metallic stearates exhibit remarkable versatility in other areas of industry. They are used to waterproof multitudes of materials, from paper to cement – facilitate mold release or extrusion of metals, ceramics, rubber – improve suspension of solids – alter the viscosity of numerous organic liquids.

WELCOME MATS TO GREET YOUR GUESTS are made of synthetic rubber produced by emulsion polymerization. The process is easier with Witco's Emcol K-8300. This emulsifier, which is also useful in the manufacture of adhesives from synthetic and natural rubber latex, offers excellent tolerance to electrolytes which coagulate conventional latices. It imparts to finished latices superior freeze-thaw stability and allows the preparation of low viscosity latices with high solids content. Emcol K-8300 stabilizes latices prepared with other emulsifiers against coagulation caused by mechanical agitation.

Other Witco quality chemicals for industry include:

ORGANIC CHEMICALS DIVISION

Metallic Stearates • Resins for Urethane Foams • Paint Driers • Emcol Emulsifiers for Agriculture, Industry, Food, Cosmetics • Phthalic Anhydride • Vinyl Stabilizers

RUBBER CHEMICALS DIVISION

Carbon Blacks • Rubber Plasticizers, Accelerators, Anti-Sunchecking Wax

PIONEER PRODUCTS DIVISION

Asphaltic Compounds for Storage Tank Insulation and Vapor-Sealing • Witcolite Insulation for Underground Piping

ULTRA CHEMICAL WORKS

Sodium and other Salts of Xylene and Toluene Sulfonic Acids (Hydrotropes) • Foam Builders and Stabilizers • Alkyl Aryl Sulfonates

SODEN CHEMICALS DIVISION OF WITCO CHEMICAL CO., CANADA, LTD.

Carries the complete line of Witco Chemicals in Canada

WITCO CHEMICAL COMPANY, Inc.
122 East 42nd Street, Dept. CW-10 New York 17, N. Y.

Please send me information on the following products:

_____

_____

I am interested in the following applications:

_____

_____

_____

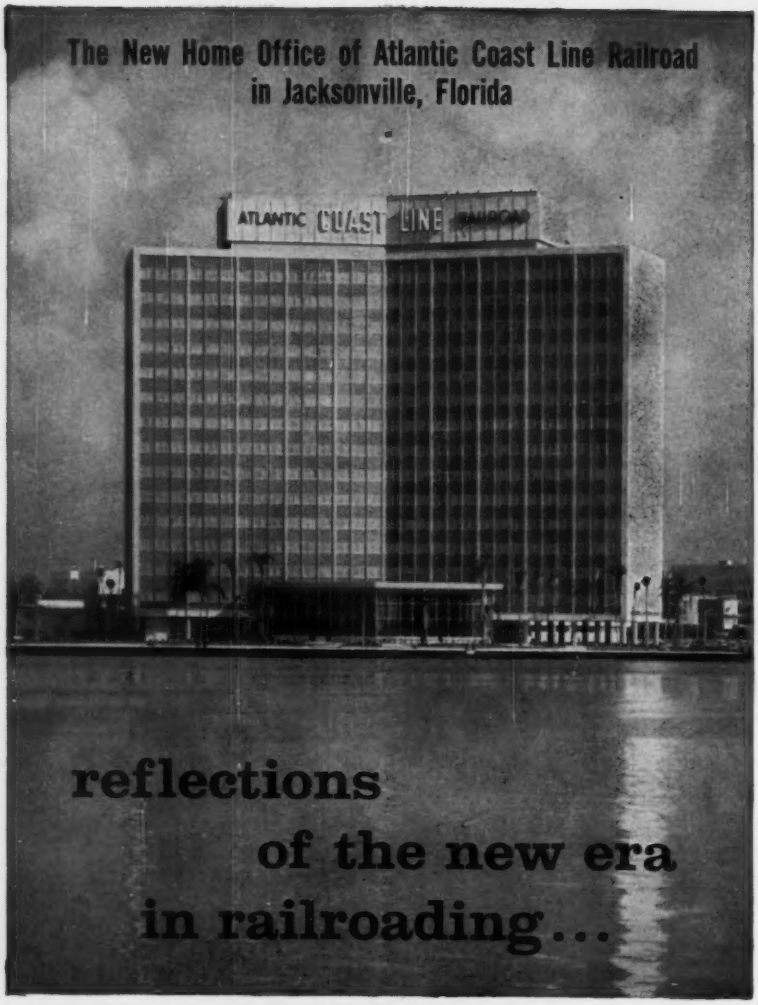
Name_____

Company_____

Address_____

City_____ Zone_____ State_____

Sales Offices in Chicago • Quincy-Boston • Akron • Atlanta • Houston • Los Angeles • San Francisco • Toronto and Montreal, Canada (Soden Chemicals Division) • London and Manchester, England • Glasgow, Scotland • Rotterdam, Holland



There's a new reflection in the St. Johns River in the heart of busy Jacksonville. Mirrored in the rippling river and rising 17 gleaming stories into the sky above is the new general headquarters of the Atlantic Coast Line Railroad.

This new building in a new home town marks a significant step forward for the Coast Line. We believe it also stands as an apt symbol of the refreshing transition now at work throughout our industry... one which promises unparalleled expansion and modernization of rail services and facilities.

Coast Line's new home at the center of our operations in the growing South is tangible evidence of our faith in this new era of more and better services for our customers.

...serving the Southeast Coastal 6

ATLANTIC COAST LINE RAILROAD

and Turkish ores—chromite ore from Transvaal, Africa, costs $25/ton ($6/ton for the ore, plus shipping charges). In comparison, it costs $45/ton just to haul U.S. ore by rail from Butte, Mont., to, say, Buffalo, N.Y. Morever, the Transvaal ore contains 44% chromium; U.S. ore, about 40%.

U.S. companies will never be able to match the cheap labor costs that permits Transvaal ore to be mined so cheaply; and the low cost of bulk ocean shipping is similarly hard for companies to match if they must depend on rail transportation. But a good way to concentrate ore on-the-spot, at the mine, might well swing favor away from imported ore, particularly if the concentration technique recovers other metals, too.

'Hot' Hydrogen Waste

Details of the radioactive hydrogen disposal process used in Consolidated Edison's Indian Point, New York, power reactor were unveiled at the Instrument Society of America's show at the Coliseum last week by the designers, Engelhard Industries, Inc. (Newark, N.J.).

The process, designed to prevent the accumulation of potentially explosive hydrogen-air mixtures, also separates the hydrogen from radioactive rare gases. This is the technique that will be used in the pressurized water reactor setup slated to generate New York City's first atomic electricity by mid-'61; capacity of the generator is 255,000 kilowatts, total.

The disposal technique was engineered to separate out radioactive hydrogen by simply combining it with oxygen to form water. Other problem materials, such as radioactive rare gases, are left to decay in storage areas.

Two separate systems are used, both fully instrumented for automatic start-up and shutdown. The first system provides for safe disposal of radioactive hydrogen gas that's used as a blanket on the primary coolant of the water reactor. The hydrogen accumulates in a storage receiver and, when a predetermined pressure is built up, is fed into a recirculating nitrogen gas stream. After this stream dilutes the hydrogen concentration and eases handling, a controlled volume of

NEED A DETERGENT?...
WETTING AGENT?...
EMULSIFIER?

TRY SWIFT'S SOLAR 90

HIGHLY CONCENTRATED
ANIONIC ALKYL ARYL SULFONATE

When you need a high quality dry synthetic surfactant so highly concentrated that 0.05% to 0.10% will give effective wetting and dispersing action, Solar 90 may be the answer. It is 90% active dodecyl benzene sulfonate with low salt content. Available in flakes or granules, both forms are uniform and free flowing. As a result of Swift's unique method of manufacture, both forms are less hydroscopic than most materials of this type.

Drum dried Solar 90 Flakes and Granules are being used in the manufacture of textiles, paints, cement, agricultural chemicals, synthetic rubber and cleaning chemicals. Evaluate Solar 90 in your process or products. It is highly soluble, high foaming and easily rinsed. It is an excellent starting material for the manufacture of detergents, cleaners, bubble bath compounds, etc. Solar 90 may save you money and improve production. Place a trial order, today.

Solar 90's are part of the extensive line of synthetic surface active agents and detergents manufactured by Swift & Company. Additional information on Solar 90 and other Swift synthetics are presented in a 24-page bulletin. Write for your copy, today.

TYPICAL ANALYSIS SOLAR 90

	Flakes	Granules
Form	Flakes up to ⅛ in. dia.	Fine granular flakes
Color	Creamy white	Creamy white
Odor	Very slight, pleasant	Very slight, pleasant
Active Ingredient, %	90, min.	90, min.
Density, gm/cm	0.44, average	0.77, average
pH, 1% Soln., 25°C.	9.0	9.0

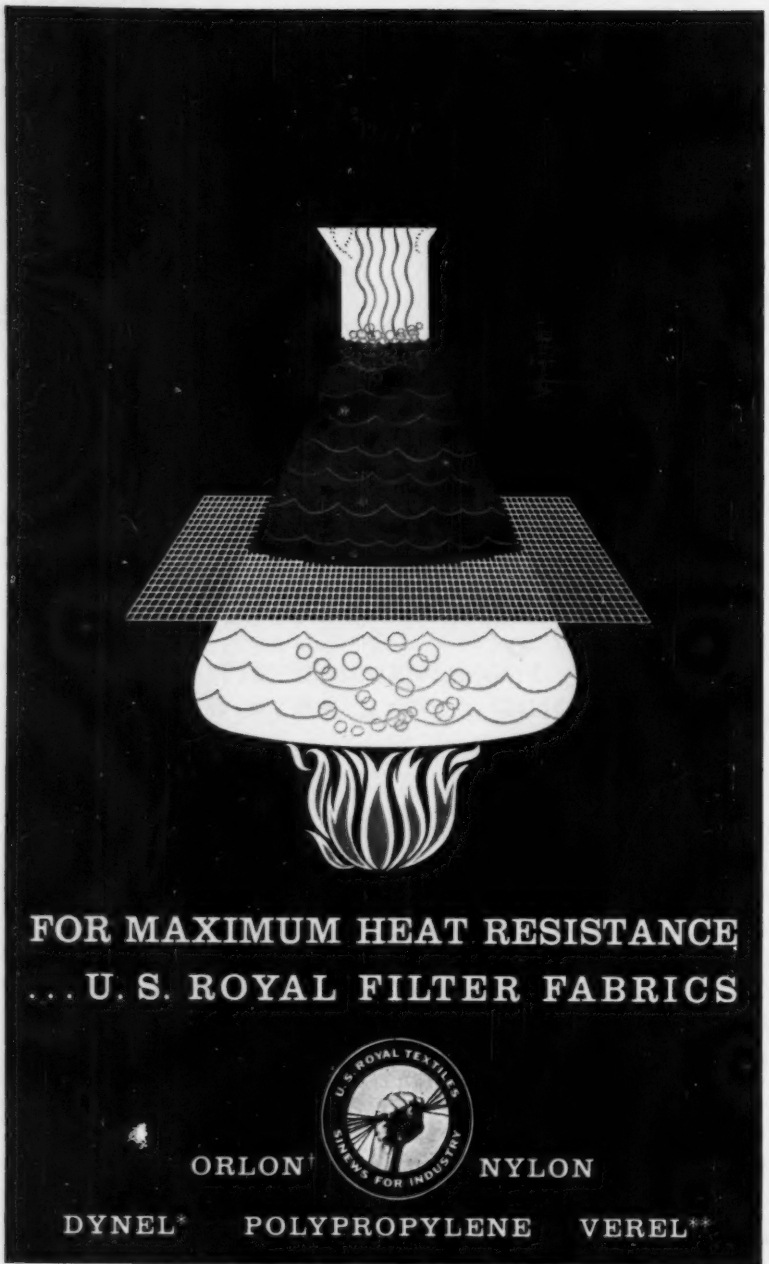
Swift

105TH YEAR

SWIFT & COMPANY
SOAP DEPARTMENT
4115 Packers Ave., Chicago 9, Illinois

To Serve Your Industry Better with a complete line of soaps, synthetic detergents and surface active agents, metallic stearates and related products.

S-76



*Union Carbide's Modacrylic Fiber **Eastman's Modacrylic Fiber †Du Pont's Acrylic Fiber.

Filter fabrics by U. S. Rubber, engineered to exacting service requirements, provide more than maximum resistance to heat. They offer utmost chemical resistance, high abrasion resistance, efficient cake retention-and-discharge properties. Write, wire or phone your specific requirements to Industrial Textiles Department at any of the following sales offices:

Glendale, California	Chicago Heights, Illinois	New York 20, N. Y.
102 N. Brand Blvd.	P.O. Box 461	1230 Ave. of the Americas
CHapman 5-5961	SKyline 4-3116	CIrcle 7-5000

Textile Division
United States Rubber

oxygen is added to combine with the hydrogen and form water.

This reaction takes place in a recombiner containing a palladium catalyst. Since the condensed water that forms is still radioactive, it must be stored for the necessary decay period. Duration of storage is highly variable, depending upon the extent of radioactivity. But the important feature of this waste gas system is that about 700 times more hydrogen can be stored as water than as gas, assuming 30 lbs./sq.in. in the holder.

The second system disposes of radioactive hydrogen evolved from the plant's waste water. Recirculating air is monitored for its radioactive hydrogen content. As soon as pressure of the hydrogen has built up to a certain level, this air stream is diverted to a recombiner. Here, in a platinum catalyzed reaction, the hydrogen and oxygen from the air is again formed into water.

PROCESSES

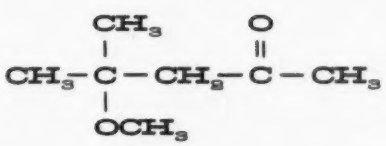
Fuel Element Packing: A sonic vibration process that is expected to greatly reduce the fabrication costs of nuclear fuel elements has been developed by General Electric engineers at AEC's Hanford, Wash., Hanford, Atomic Works. The process uses a 24,000-watt amplifier to energize an electromagnet at frequencies of 5 to 5,000 cycles per second.

In operation, 8-ft.-long jacketing tubes are mounted in the vibrator, and powdered fuel is poured into their tops. The vibrations compact the fuel to 90% of theoretical solid density in about three minutes. Then caps are welded onto the tubes, and they are tested prior to assembly into a cluster.

•

Osmium Isotopes: Gram quantities of osmium isotopes have been isolated using an new Union Carbide Corp. electromagnetic process. At the Atomic Energy Commission's Oak Ridge National Laboratory, extremely toxic osmium oxide,—concentrations of only 10^{-6}g./cu. meter of air can cause lung congestion and eye damage—is the feed material, rather than metallic osmium, because of the very low vapor pressure of osmium. The oxide is vaporized and the isotopes separated in a rigorously controlled magnetic operation.

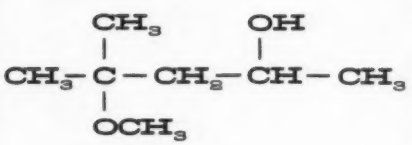
2 NEW HIGH BOILING SOLVENTS FROM SHELL



PENT-OXONE*

SOLVENT

KETO-ETHER



PENT-OXOL*

SOLVENT

GLYCOL-ETHER

A new chemical class of solvents incorporating the best qualities of ketones and glycol ethers

*Trademarks, SHELL CHEMICAL COMPANY

2 new high boiling solve
acrylic, vinyl, and nitro

PENT-OXONE
SOLVENT

Description

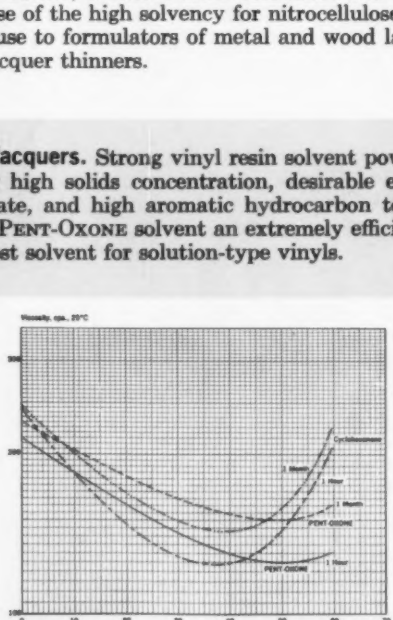
Pent-Oxone is a new keto-ether which offers the user excellent solvency for a wide variety of dissimilar resins. It is a high boiling active solvent which makes possible economical lacquer formulations of superior performance.

USES

Acrylic lacquers. Where large portions of high boiling active solvents are needed, PENT-OXONE supplies you with a high-performance solvent at lower cost. It promotes low viscosity, superior gloss and flow properties. Solvent release characteristics of PENT-OXONE provide a film with good moisture resistance.

Nitrocellulose lacquers. High boiling PENT-OXONE is an outstanding solvent for nitrocellulose lacquers. It provides low viscosity, dilution ratios comparable to low boilers, excellent blush-resistance and flowout. Because of the high solvency for nitrocellulose, it will be of use to formulators of metal and wood lacquers, and lacquer thinners.

Vinyl lacquers. Strong vinyl resin solvent power providing high solids concentration, desirable evaporation rate, and high aromatic hydrocarbon tolerance make PENT-OXONE solvent an extremely efficient, yet low-cost solvent for solution-type vinyls.



Solution Viscosity, 20% wt. (1)Vinylite® VMCH in Indicated Solvents

(1) Registered Trademark, Union Carbide Corporation

PHYSICAL PROPERT

Both are high boiling, active solvents, in appearance, and possess a mild odo

PENT-OXONE Solvent	PENT-(Solv
ASTM Boiling Range	
147.0—163.0°C.	163.
Flash Point	
141°F.	140

VISCOSITIES OF ACRYLIC RESIN[1] SO
(15 Per Cent Weight Resin)

	A-21[2]	B-44[3]
EGMEE Acetate	26	23
Diacetone Alcohol	48	36
Ethyl Amyl Ketone	18	14
PENT-OXOL Solvent	30	25
PENT-OXONE Solvent	22	20

(1) Resins are products of Rohm and Ha
(2) Commercially available solution 15%w with indicated solvent. Solv consists of:

Toluene	45%
Butyl Alcohol	5%
Indicated Solvent	50%

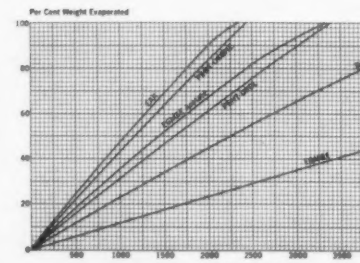
(3) Commercially available solution 15%w with indicated solvent. Solv consists of:

Toluene	26.5%
Indicated Solvent	73.5%

NITROCELLULOSE SOLVENT PROP

High Boiler	Viscosity, Cps., 25°C.	Blush Resistance, % R.H., 80°F.	To
PENT-OXOL	100	93	
PENT-OXONE	87	91	
Diacetone Alcohol	134	82	
Ethyl Amyl Ketone	74	94	
Ethylene Glycol Monoethyl Ether (EGMEE) Acetate	64	91	
Ethylene Glycol Monobutyl Ether (EGMBE)	105	96	

*At a concentration of eight grams R.S. second Nitrocellulose per 100 mils solv



Solvent Evaporation Rates

PENT-OXOL*
SOLVENT

PENT-OXONE*
SOLVENT

*Trademarks, Shell Chemical Company

SHELL

Shell Chemical Company, Advertising Department, 50 West 50 St., New York 20, N. Y.
For more information on PENT-OXONE solvent and PENT-OXOL solvent ☐
For a visit from a Shell representative ☐

Name_____ Position_____
Company_____ Street_____
City_____ Zone_____ State_____

vents for use in
rocellulose lacquers

ERTIES

ents, water white
d odor.

ENT-OXOL
Solvent
ge
163.8–167.0°C.

140°F.

IN[1] SOLUTIONS
Resin)

[3]	B-66
23	16
36	17
14	7
25	25
20	15

nd Haas Company.
ution reduced to
. Solvent mixture

45%
5%
50%

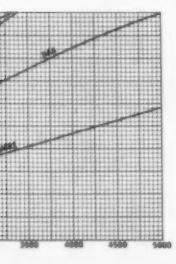
ution reduced to
. Solvent mixture

26.5%
73.5%

PROPERTIES*

ance, 0°F.	Dilution Ratio Toluene	Dilution Ratio "TOLU-SOL"®
	4.7	1.3
	3.1	0.9
	2.3	0.6
	2.2	0.9
	2.5	0.9
	3.3	1.8

ms R.S. ½-
mils solvent.



Rates

PENT-OXOL

SOLVENT

Description

Pent-Oxol is a high boiling glycol ether. Its solvency and volatility help you achieve a desirable balance of lacquer properties such as viscosity, flowout, gloss, and blush-resistance.

USES

Acrylic lacquers. Because high boiling PENT-OXOL gives superior gloss to acrylic films, it is a desirable choice for your acrylic formulations.

Nitrocellulose lacquers. PENT-OXOL is an outstanding blush-retarder for nitrocellulose lacquers . . . yet the prolonged evaporation time usually encountered is no problem. Its evaporation rate and good solvency make it particularly suitable for use in high-low type thinners.

Vinyl coatings. Preliminary data indicate that PENT-OXOL peptizes vinyl chloride homopolymers suggesting its use as an organosol dispersant.

SHELL

SHELL CHEMICAL COMPANY
INDUSTRIAL CHEMICALS DIVISION

Atlanta • Chicago • Cleveland • Detroit • Houston • Los Angeles • Newark • New York • San Francisco
IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Montreal • Toronto • Vancouver

SEE BACK PAGE FOR 22 IMPORTANT USES

OTHER SURFACE COATING APPLICATIONS

In epoxy coatings, PENT-OXONE and PENT-OXOL solvents can be used to balance properties such as pot life, viscosity, flowout, gloss and flexibility.

These two new solvents are useful as high boilers in thermo-setting acrylic formulations, vinyl-acrylics, and others.

22 suggested uses for Pent-Oxone and Pent-Oxol

Aerosol vapor pressure modifier
Agricultural chemical solvents
Cellophane adhesive solvents
Cosmetics
Dry cleaning soaps (coupler), stain removers
Duplicating fluids
Dye solvents
Extraction and crystallization
  in drug and antibiotic manufacture
Gelatin sizes for cellulose acetate fibers
Glass cleaners
Ingredients of slushing compounds
Internal combustion engine cleaners
  Carbon removers
  Carburetor cleaners
  Engine desizers
  Sludge solvents
  Valve destickers
  Varnish removers
Liquid soap ingredients
  (improve storage clarity, viscosity, stability)
Low-temperature brines
Lubricating oil additives
Metal parts cleaner formulations
Mineral oil dewaxing
Nail polish lacquers
Perfume fixatives
Printing inks, nitrocellulose and aniline types
Rosin soldering flux solvent
Rust removers
  (improve penetration, degreaser) (H_3 PO_4 type)

SHELL CHEMICAL COMPANY
INDUSTRIAL CHEMICALS DIVISION

Atlanta • Chicago • Cleveland • Detroit • Houston • Los Angeles • Newark • New York • San Francisco
IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Montreal • Toronto • Vancouver

SHELL

U.S. Potash Marketing Map

Potash Sources in Turmoil

With Texas Gulf Sulphur on the verge of joining the ranks of U.S. potash producers, and Canadian potash production expected to start during the next year or two, some big changes in sources of U.S. potash seem inevitable (see map above). Just how these developments will affect the industry is a big question. Here is how the situation shapes up today.

Newest consideration, of course, is the Texas Gulf move (*CW, Oct. 8, p. 40*).

TGS's decision to move into the potash field has not been finalized yet, must still be approved by the board of directors. However, the company has been actively studying the potash market and conducting drilling and engineering work. These factors, coupled with the recent statement by TGS's president, Claude O. Stephens, that he "would strongly recommend his directors authorize diversification into potash, if studies nearing completion are as favorable as the interim reports," convince many observers that there's little question but that TGS will go ahead with its project. Under an agreement made with Delhi-Taylor last April, TGS has until Jan. '61 to exercise an option to acquire and commercially develop the potash area of Cane Creek, Utah (in southeastern Utah, near the town of Moab). Delhi-Taylor holds the potash

U.S. and Canadian Potash Producers

Company	Location	K_2O Capacity (1,000 Tons Year)
U.S.		
American Potash & Chemical Corp.	Trona, Calif.	225
Bonneville, Ltd.	Wendover, Utah	50
Duval Sulphur and Potash Co.	Carlsbad, N.M.	250-260
International Minerals & Chemical Corp.	" " "	375
National Potash	" " "	250-260
Potash Co. of America	" " "	575
Southwest Potash Corp.	" " "	250-260
U.S. Borax & Chemical Corp.	" " "	540
Others		10
CANADA		
International Minerals & Chemical Co. of Canada	Esterhazy, Saskatchewan	250
Potash Co. of America	Saskatoon, Saskatchewan	300-350

LOOKING FOR A BARGAIN —IN DRY SOLIDS MIXING EQUIPMENT?

PLEASE READ CAREFULLY BEFORE DETACHING

Many people do . . . processors who spare no expense in otherwise equipping a process with the most modern, up-to-date, time and labor saving equipment that money can buy.

Cement mixer technology*—in the space age—is time consuming, wasteful, costly and downright dangerous. It takes *more* than a simple tumbling, stirring or agitator action can *give* . . . to achieve the kind of thorough, intimate controlled dispersion that today's quality control standards *demand*. Improperly specified or "bargain" mixers will quickly take their toll in *profits* through waste, rejects, reprocessing or remixing time and expense.

The rapid increase in the use of the *Simpson Mix-Muller* has paralleled an increasing availability of more uniform raw materials. It has also paralleled a growing demand for better solids-mixing technology.

If you mix dry solids, we would like to show you how *controlled dispersion* in a Simpson Mix-Muller can help you achieve better blends of critical materials—how you can actually save valuable raw materials and in many cases *eliminate* secondary operations—by making the *most* of mixing properties. Write for our Handbook on Mulling or for details on a confidential, laboratory conducted mulling survey.

*No offense intended to concrete or "cement" mixers. You don't need a Mix-Muller to prepare concrete. Allusion is made to the too-popular conception that a mixer, any mixer, is something that goes "putty, putty." (Remember the song? "Cement mixer—putty, putty.")

DRY SOLIDS MIXING IS OUR ONLY BUSINESS . . .

SIMPSON MIX-MULLER DIVISION
NATIONAL ENGINEERING COMPANY
642 Machinery Hall Chicago 6, Illinois

producing leases on the area.

In return, D-H will share in the net profits of the potash operation—getting between 15-25% of the net profits (higher potash production, lower percentage return; lower production, higher returns).

TGS plans as now stated call for construction of the world's largest potash plant at the Moab site. Initial capacity would be about 8,000 tons/day of ore, with provision to expand to 12,000 tons/day as demand increases. On a yearly basis, this works out to approximately 700,000 tons of K_2O equivalent for an 8,000-tons/day ore operation.

If the TGS board approves the venture and construction starts early in '61, it's likely TGS could get into production sometime in '64. It should take about three years to sink the shaft, build a plant, and get into production.

Rosy Outlook for U.S.: Reason for the sulfur company's eagerness is plain. Heavy demands for potash, not only in the U.S. but throughout the world, are now pushing the Carlsbad, N.M., producers and other U.S. producers to near-capacity operation.

This can be seen in the recently released figures by the American Potash Institute Inc. For the fertilizer year ended June 30, '60, total deliveries were 2.73 million tons of K_2O, an increase of 9% over the same period of '58. The difference between these figures and rated U.S. capacity (*see chart*) can be explained by reduced inventories, plus some Canadian imports last year. About 95% of U.S. deliveries are for agricultural applications.

While API does not show stocks in the hands of producers, some idea of the dwindling of these supplies can be gleaned from the Bureau of Mines '59 potash report.

According to this, potash stocks had been built up during the '50s, hit 560,000 tons [K_2O basis] in '57. But growing demands have whittled this reserve down, and by the end of '59, stocks were only 277,000 tons. This depletion is continuing in '60.

Since capacity figures are flexible, and generally refer to normal operating conditions, there is little doubt that potash producers will be able to squeeze a little bit more out of existing facilities.

Meanwhile, new sources are on the

Get your money's worth . . .

specify CARBIDE's ISOBUTANOL and ISOBUTYL ACETATE

It makes sense to buy your isobutanol and isobutyl acetate from CARBIDE's new commercial facilities. Here's why—

You can buy minimum bulk quantities at the tank-car price. The reason: only at CARBIDE can you get all your solvents—alcohols, esters, ketones, and glycol-ethers—together in combination bulk shipments. By making up the balance of the tank car or tank truck with your other solvent needs, you save four cents a pound, or 26 cents a gallon, over the same amount of isobutyl solvents in LCL shipments; in combination carloads of drums, you save two-and-a-half cents a pound, or 16 cents a gallon.

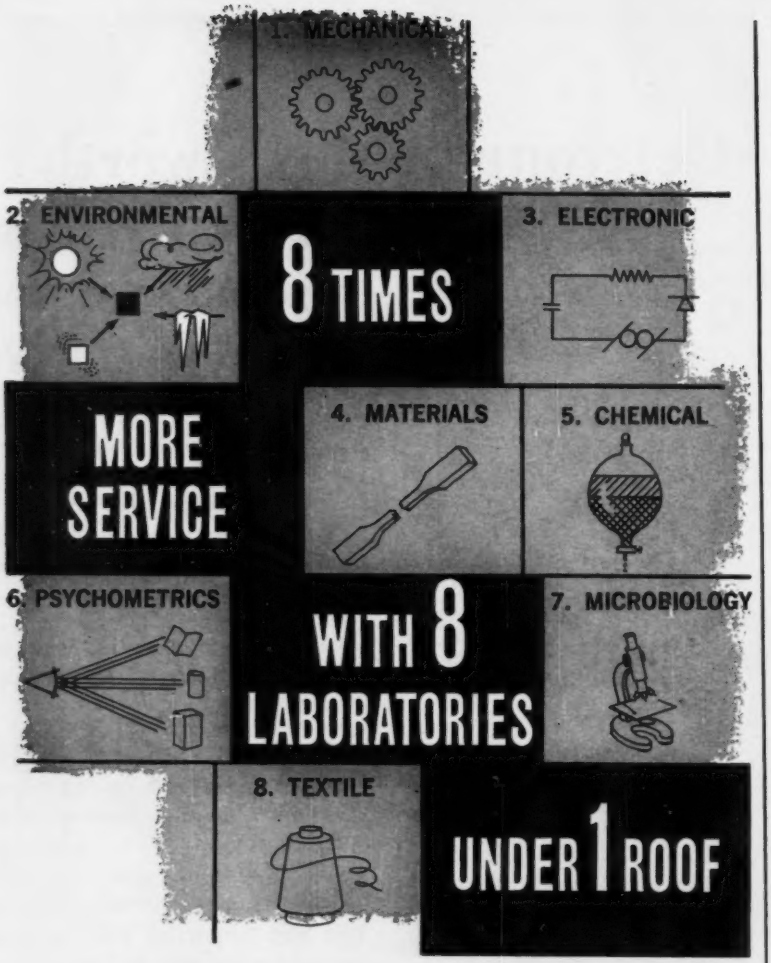
Here's another dollars-and-cents reason:

You get impartial solvent advice that saves you money and improves your formulations. Different families of solvents contribute different properties. For many formulations a blend of two or more solvent types gives the best results in performance and savings. CARBIDE supplies them all—can tell you how to formulate with them all—can show you how to save with them all—and then, can deliver them in money-saving combination shipments.

Let a CARBIDE Technical Representative show you how the full line of solvents can be put to work to save you more and serve you better. Call your nearest CARBIDE office, or write to Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York.

UNION CARBIDE CHEMICALS COMPANY

UNION CARBIDE



Whether it's a routine control analysis of an alloy, an environmental test of a "black box", or a complete structural and operating evaluation...whether it's appliances or batteries or turbines or valves...you get more from the **integrated laboratories** of United States Testing Company. Multi-million dollar facilities...career test engineers...a wealth of experience in your field...all these save you costly investment in laboratory equipment and give you top-quality testing and R/D services. Check *your* needs against the facilities and services available.

Send For Free Facilities Bulletin.

PHE-8

The World's Most Diversified Independent Laboratory.

United States Testing Co., Inc.
1415 Park Avenue, Hoboken, N. J.

Branch Laboratories | BOSTON · BROWNSVILLE · DALLAS · DENVER · LOS ANGELES MEMPHIS · NEW YORK · PHILADELPHIA · TULSA

way. Southwest Potash Corp.—a division of American Metal Climax—is spending nearly $3 million to expand its facilities at Carlsbad, N.M.

In Utah, Bonneville, Ltd., which produces potash by solar evaporation, has awarded a contract to Gibbons and Reed Co. (Salt Lake City) to dredge a new, 4,300-acre evaporation pond at Wendover, Utah.

American Potash is also expanding its Trona, Calif., operations by 25%.

In Canada, two Carlsbad producers, Potash Co. of America, and International Minerals, are also pushing hard to bring in north-of-border operations. Last year, PCA was in production for a short time (it turned out 46,500 tons of K_2O), but it was forced to suspend operation last November, since water was leaking into the shaft. Cementations Ltd. is now working on a grouting program to stop the leakage.

IMC got its shaft down to the 1,200-ft. level at which point they hit a troublesome sand and water zone. The company is now using a Galloway stage to get down to the potash deposits, some 3,000 ft. below the surface (*CW, March 19, p. 68*).

While neither company will pinpoint when they will be in production, trade guesses are that they can make it within the next year or two.

Tight Supply/Demand Picture: Two factors are primarily responsible for tightness of the potash supply situation:

(1) Growing worldwide demands for fertilizer, hence potash.

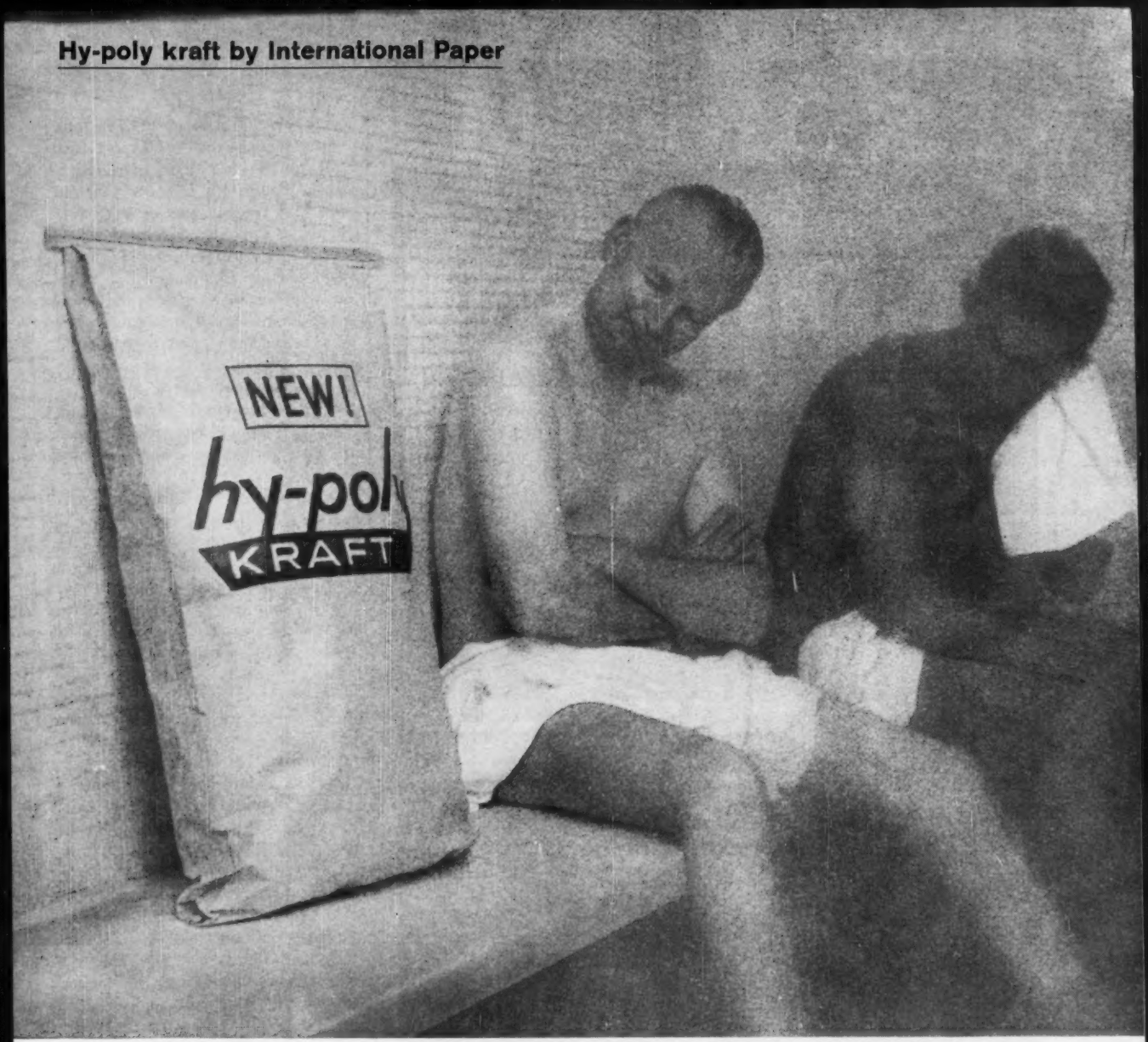
(2) Promises, followed by delays, of big Canadian potash supplies.

The fertilizer demand rise is simply attributed to the world population increase and the boosted need for fertilizer. And potash is riding this boom. In '59, world output of potash was the highest on record, totaled 9.4 million tons of K_2O, an increase of 7% over '58.

But capacity has not kept pace with this growth. While many people were aware of what was developing, the prospect of a large new source of potash—Canada—caused most producers to hold back their expansion plans. Thus, world facilities are being pushed to the limit, and it's not likely this situation will change much soon.

Export-Import Picture: U.S. exports have drained off some domestic supplies. Overseas shipments of potash increased 61% during the fertilizer year

Hy-poly kraft by International Paper



This "Hy-poly" Bagpak® multiwall was given a 360-hour Turkish bath to demonstrate its moisture-resistant properties.

Trial by steam bath!

Read how new humidity-proof Hy-poly kraft makes medium- and low-density polyethylene sheets extravagant by comparison.

THE multiwall bag in our picture is made of Hy-poly kraft. It contains *calcium chloride.*

International Paper steamed this multiwall in 90% relative humidity at 100° F. for 360 hours! (Unprotected, under these conditions, calcium chloride takes on 2½ times its weight in water in about an hour.)

But when the bag was opened, the thirsty crystals spilled out as though they had been stored in the middle of the Sahara!

Bagpak's Hy-poly kraft is not only humidity-proof. It *saves money,* too. Savings range from $2 to $16 per thousand multiwalls.

Hy-poly kraft is so superior to medium- and low-density PE sheets that you get equal, if not greater, moisture-vapor protection from a coating about *half as thick!*

This dramatic new barrier sheet is a product of 62 years of papermaking and packaging experience. It is only part of a *complete* multiwall packaging service offered to you by International Paper.

Whatever your multiwall packaging needs, it will pay you to talk to your Bagpak packaging engineer. He has complete information. It's yours for the asking.

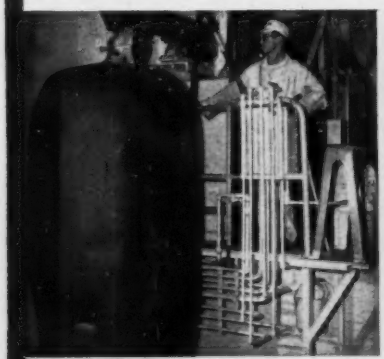
INTERNATIONAL PAPER
BAGPAK DIVISION · NEW YORK 17, N. Y.

PROBLEM:

HANDLE SARAN RESIN IN BULK
WITHOUT DANGER OF CONTAMINATION

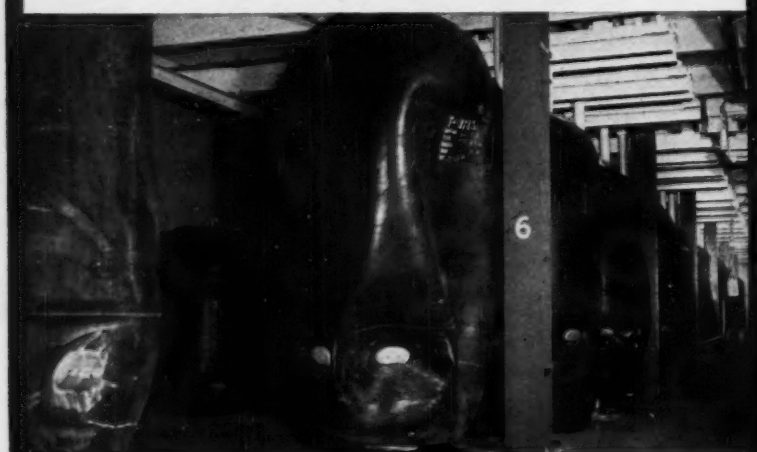
SOLUTION:

USE PROVEN U.S. SEALDBIN CONTAINERS



Loading Saran into U.S. Sealdbins in a completely closed system guarantees protection from outside contaminates.

Rugged U.S. Sealdbins are their own weather-resistant, hermetically sealed warehouses — unaffected by exposure.



Transferred indoors, U.S. Sealdbins are unloaded in a completely closed system. From filling, to storage, to emptying, Saran Resin remains free of contamination.

Pictured above, U.S. Sealdbins are handling Saran Resin at Dow Chemical Company's Midland, Michigan, plant. Made of high-strength cord fabric and custom-compounded synthetic rubber, U.S. Sealdbins are rated tops in weather and corrosion resistance. Collapsible, they can be returned in but a fraction of their outbound space. Find out how much time, labor and money U.S. Sealdbins can save in your operation. Write, wire or phone

US RUBBER

TRANSPORTATION PRODUCTS DEPT.
United States Rubber
10 Eagle St., Providence, R. I., DExter 1-4000

ended June '60, totaled 381,716 tons.

Largest share of this export total went to the Far East, particularly Japan. Figures for calendar year '59 show that 189,142 tons of K_2O were shipped to Japan, 25,541 tons to New Zealand, 16,876 tons to Formosa, 4,104 tons to Philippines and 1,241 tons to Korea. This area of the world should continue as a strong outlet for both Carlsbad and Trona potash, could grow in importance if India becomes an important purchaser of material.

Brazil, which took 37,703 tons of K_2O, and South Africa, which picked up 15,418 tons, are other promising outlets.

In addition to the agricultural material, 11,379 tons of nonagricultural K_2O left the country, with Japan taking 10,553 tons of this.

Import Story: The U.S., of course, also imports potash. Major sources are West Germany, France and Spain (in that order). Some material was imported from East Germany and Canada, but the East Germans dropped out of the U.S. market, and Canadian potash operations have been halted.

Most imports come in along the East Coast, with the largest shipments arriving through the ports of Norfolk, Va., and Baltimore, Md. Penetration usually extends about 50-100 miles inland. The lower cost of water shipping, particularly in foreign bottom ships, gives imports a definite advantage over domestic Western supplies. Once the foreign material is put on rails, however, costs start to mount rapidly, and Carlsbad material becomes competitive.

Canada vs. Utah: With this backdrop, where will the two Canadian and TGS's operations fit into the picture? The biggest factor will be who can get into operation first, since the world definitely needs another source of potash.

Both Canadian operations have the edge from this point, since shafts have already been started and the engineering problems are expected to be overcome shortly. But TGS must still wait for approval by the board (almost sure to be given) and will then need three years to get into production (assuming no major difficulties).

One effect of TGS's entry into the field would be to slow down further expansion plans in Canada. While many companies are interested in starting potash operations there, all

DESIGN/EXPERIENCE/CONSTRUCTION RELIABILITY/VERSATILITY

At Vitro, these are more than just words. In each Vitro project, they become realities. ■ This nitric acid unit at Nangal, India is part of a new $52 million chemical fertilizer/heavy water complex. Slated to go on stream in December 1960, Nangal will supply 85,000 tons of fixed nitrogen and 14.5 tons of heavy water per year to India's economy.
Vitro is overall technical consultant. Experienced Vitro engineers provided feasibility and layout studies, furnished architect/engineer services and today coordinate construction for Hindustan Chemicals and Fertilizers Ltd.

Vitro

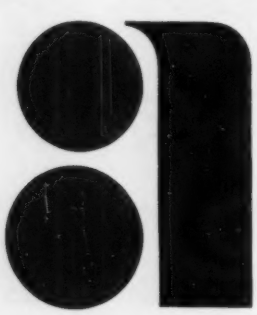
VITRO ENGINEERING COMPANY/A Division of Vitro Corporation of America/NEW YORK · WASHINGTON · LOS ANGELES · TORONTO/OVERSEAS: GENEVA · MILAN · BOMBAY

H.A. and D.M.B.

ANSUL H.A.—our trade name for Para Hydroxy Anisole (which you may also know as Monomethyl Ether of Hydroquinone)—has found widespread acceptance as a stabilizer for chlorinated hydrocarbons, motor fuels, rubber and plastics such as acrylonitrile and acrylates. It's also an excellent non-discoloring anti-oxident as well as a valuable chemical intermediate. May we also suggest your investigation of H.A.'s sister product—ANSUL D.M.B.—alternately known as Para Dimethoxy Benzene or Dimethyl Ether of Hydroquinone. D.M.B. is used in the manufacture of synthetic dyes and offers possibilities as a weathering agent in paints, lacquers, plastics and in sun tan lotions and creams. Its sweet-clover odor may suggest uses in cosmetic formulations. Samples, specification data and technical consultation are available. Please write ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN

PROPERTY DATA

Physical Properties Compound	H.A. para Methyoxy Phenol	D.M.B. para Dimethoxy Benzene
Chemical Formula	$CH_3OC_6H_4OH$	$C_6H_4(OCH_3)_2$
Molecular Weight	124.13	138.16
Boiling Point °C		
760 mm. Hg.	243°	213°
100 mm. Hg.	175°	140°
50 mm. Hg.	160°	123°
10 mm. Hg.	126°	89°
Melting Point °C.	53°	56°
Density gms./ml. (65°C)	1.1106	1.0293
Solubility (25°C in gms./100 gms. solvent)		
Water	4.1	Insoluble
Benzene	69.5	177.0
Acetone	426.0	233.0
Ethyl Acetate	245.0	150.0
Alcohol	456.0	33.3
Color	Tan to white	White
Odor	Characteristic	Sweet Clover



ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN ● INDUSTRIAL CHEMICALS ✱ REFRIGERATION PRODUCTS ● FIRE FIGHTING EQUIPMENT

are waiting to see how PCA and IMC fare. If such potential producers wait the year or so for the outcome of these two ventures, they will almost surely have to trail TGS onto the market (allowing the usual three years to set up operations).

Rich Lode: An important consideration is that both the Canadian and Utah deposits have a higher potash content than does Carlsbad. Both have ores that yield well over 22% K_2O, while Carlsbad runs ⅛% K_2O. From this standpoint either area would probably have lower production costs.

From the freight standpoint, the railroads have long tended to equalize rates; therefore locale will not be a serious factor.

TGS's experience in the sulfur business includes dealing with fertilizer makers — a big help in getting into some of the potash markets.

Carlsbad producers may find their positions weakened by the lower grade of New Mexican ore. However, there is no doubt that local markets will survive, where there is a good freight advantage.

Over Ocean View: But there will be competition for overseas markets. All three locations have a ready outlet to the Far East. In addition, Canada will be looking at the St. Lawrence Seaway to move goods to Africa and South America.

While many observers look for a real competitive situation, particularly in the U.S. if TGS goes ahead with its plans, growing worldwide demands may really determine if there is to be overcapacity in North America. As one observer points out, world potash demands have been increasing at the rate of 350-600,000 tons/year of K_2O. This is the output of a major mining operation.

And while some new capacity will be coming in from established U.S. and foreign producers, tonnages thereby added are nowhere near that of either Canada or Utah.

Outlook for the next five or 10 years: domestically, competition will continue keen; abroad, there won't be extreme competition, but there will be growing markets. It is this prospect of growing markets overseas (due to rising world fertilizer and food needs), in fact, that will help keep U.S. supplies from being excessive in spite of new plants—since other nations will be quick to grab any of our overages.

DOES YOUR PRODUCT REQUIRE A WAX WITH THESE QUALITIES?

- ☑ Hardness
- ☑ Low cost
- ☑ Solvent retention
- ☑ Emulsifiability
- ☑ Chemical inertness
- ☑ Water insolubility
- ☑ Solubility in hot solvents
- ☑ Ease of Saponification
- ☑ Compatability with dyes and other waxes
- ☑ Electrical insulating capacity

Then RIEBECK ROMONTA® MONTAN WAX

Is the wax you're looking for! This remarkable wax can be economically adapted for your industrial and manufacturing requirements. For Free Sample and specifications, write today to:

STROHMEYER & ARPE CO.

LEGAL NOTICE

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF

CHEMICAL WEEK published weekly at Philadelphia, Pennsylvania for October 1, 1960.

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Published by McGraw-Hill Publishing Company, Inc., 330 West 42nd St., New York 36, N.Y.; Editor, Howard C. E. Johnson, 330 West 42nd St., New York 36, N.Y.; Managing editor, Ralph B. Schulz, 330 West 42nd St., New York 36, N.Y.; Business manager, Alvin J. Babkow, 330 West 42nd St., New York 36, N.Y.

2. The owner is McGraw-Hill Publishing Company, Inc., 330 West 42nd St., New York 36, N.Y. Stockholders holding 1% or more of stock are: Donald C. McGraw & Willard T. Chevalier, Trustees under Indenture of Trust m/b James H. McGraw, dated 1/14/21 as modified; Donald C. McGraw & Harold W. McGraw, Trustees under an Indenture of Trust m/b James H. McGraw, dated 7/17/37, as amended; Donald C. McGraw, individually; Estate of Mildred W. McGraw, Donald C. McGraw and Catharine McGraw Rock, Executors; (all of 330 West 42nd Street, New York 36, N.Y.); Grace W. Mehren, 536 Arenas St., Lajolla, Calif.; Affiliated Fund, Inc., 63 Wall St., New York, N.W.; Genoy & Co., P.O. Box 491, Church St. Station, New York, N.Y.; Touchstone & Co., c/o Wellington Fund, Inc., Claymont, Delaware.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 42,865.

McGRAW-HILL PUBLISHING COMPANY, INC.
By John J. Cooke, Secretary

Sworn to and subscribed before me this 15th day of September, 1960.

[SEAL] JANET A. HARTWICK
(My commission expires March 30, 1961)

Your chances are better in a Duraglas® "salespackage"

OFTEN choices are switched at the last instant—*when the customer compares packages at the market place.* Because we work at it constantly, we at Owens-Illinois think we know a lot about how to design packages which *sell.* A Duraglas "salespackage" attractively combines container, closure and label.

DURAGLAS CONTAINERS
AN (O) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES • TOLEDO 1, OHIO
PACIFIC COAST HEADQUARTERS • SAN FRANCISCO

Just Published ***comprehensive manual on***
HANDLING C_4 HYDROCARBONS

Having higher vapor-pressure, Petro-Tex C_4 Hydrocarbons require somewhat different handling and unloading facilities and techniques than heavier olefins. Our new manual, "Handling C_4 Hydrocarbons", provides prospective users a background for understanding these differences and the voluminous codes and regulations on the safe handling of flammable hydrocarbons in pressure-type containers.

Included are shipping data on all Petro-Tex chemicals as well as handling and storage techniques and general information regarding the unloading of cylinders, tank trucks, tank cars and barges. Fire and explosion precautions and a bibliography of references to safety codes and governmental regulations (keyed to the text) complete this useful manual.

We will be pleased to send a copy to those whose work may lead to broader use of Petro-Tex chemicals. We also invite inquiries on

BUTADIENE **ISOBUTYLENE** **DIISOBUTYLENE**
TRIISOBUTYLENE **n-BUTENE-1** **n-BUTENE-2**

Petro-Tex®

PETRO-TEX CHEMICAL CORPORATION

8600 PARK PLACE BOULEVARD, HOUSTON 17, TEXAS

JOINTLY OWNED BY
fmc FOOD MACHINERY AND CHEMICAL CORPORATION
TENNESSEE GAS TRANSMISSION COMPANY

Market Newsletter

CHEMICAL WEEK
October 15, 1960

Heavy overcapacity continues to plague the plywood industry. Three major manufacturers recently reported new production cutbacks in an effort to hold the current price line. For example:

Hub City-Three Sisters plants, one of the largest manufacturers of sheathing, is dropping output to 60% of capacity, while Roseburg Lumber Co. is working at 70% of its output potential. Another outfit, Simpson Logging Co., will gear its production to whatever it can sell.

For chemical adhesives makers this means a dropoff of demand during the second half of the year, with total output during the year expected to be down slightly. In the first six months of '60 softwood plywood production increased 8% over output in first-half '59, totaled 4,084 million sq.ft. Hardwood plywood, however, was off, to 455 million sq.ft., in first-half '60, vs. 483 sq.ft. during the same period of '59.

Reason for the pricing troubles—and now the cutbacks—is sudden overcapacity. During the past year 16 new mills started operations, bringing the total number to an estimated 170-175.

In the future, most sources believe, the present price situation will continue until more mills can develop their own sales agencies. There are now three big companies—Weyerhaeuser, Georgia-Pacific and U.S. Plywood—that do control their own sales, but most of the other producers turn their output over to wholesalers, who now have a sharp effect on the market.

•

Closedown of production of Light Hydrocarbon Plant no. 1 is being completed this week by Dow's Texas Division at Freeport, Tex. Reason for the move: excess capacity for ethylene, which exceeds present division needs. The plant is the oldest of the five light-hydrocarbon facilities in the Texas Division.

•

An "all plastic" automobile made of parts now in standard use will be on display at the National Auto Show in Detroit this week. It contains more than 300 plastic components like those now in '61-model passenger and commercial vehicles.

The Society of the Plastics Industry, Inc., which is exibiting the auto, says the position of plastics in the automotive field has grown rapidly. Seven years ago, the average car contained 11 lbs. of plastic. The '61 models on display now average slightly more than 22 lbs./car, which replaces approximately 150 lbs. of steel and other metals. Conservative estimates are that by the end of the '60s there will be a 500-million-lbs./-year market for plastics—60 lbs./car.

Reports that Russian potash will be coming into the U.S. are being heard again. Some imports (5-6,000 tons) were reported earlier this year, with more on the way. However, these are small shipments, have little impact on the market.

•

Recently discovered Sicilian potash deposits are enabling Italy to meet its own requirements. Earlier this year, Montecatini started processing ore in a new plant at Camofranco. Capacity is 3,000 tons/day of ore, with plans in the works to increase this to 7,000. (*See also p. 89*).

•

The largest aluminum rolling mill in Europe has just been put in operation at Monmouthshire, South Wales, England, by Alcan Industries Ltd., a subsidiary of Aluminium Ltd. By expansion and modernization of its continuous strip mill, company has been able to increase capacity from 50,000 to 70,000 tons/year, with a substantial extra capacity for hot-rolled coil and plate. Provisions have been made for an eventual capacity increase to 175,000 tons/year.

•

In Canada aluminum production has been cut back by Aluminum Co. of Canada. Output of one of the company's potlines in its Arvida, Que., aluminum smelter has been halted. The cutback amounts to about 17,000 tons/year of basic aluminum. Earlier this year the company was producing at a rate of 690,000 tons/year to meet international sales commitments and re-establish inventory levels.

•

Also in Canada a $3.5-million zinc sulfide roasting plant and sulfuric acid unit has been completed by Sherbrooke Metallurgical Ltd., at Dunnville, Ont.

•

Output of man-made fiber in the United Kingdom set new highs last month. In August 43.2 million lbs. of fiber were turned out, the highest ever recorded for the month. Filament yarn production increased the most, accounting for 21.5 million lbs., compared with 18.2 million lbs. in '59. Staple was up slightly—21.7 million lbs. vs. 21.5 million last year.

Total production in the first eight months of '60 was 395.2 million lbs., compared with 353.6 million in the previous eight-month period and 325.3 million lbs. in the first eight months of '59.

SELECTED PRICE CHANGES—WEEK ENDING OCTOBER 10, 1960

	Change	New Price
UP		
Cottonseed oil, crude, tanks, East	$0.0025	$ 0.095
Sandalwood oil, cns.	0.50	23.50
DOWN		
Stearic acid, pressed, bgs.	$0.005	$0.1525
Tin metal, Straits	0.01	1.03
Itaconic acid, tech., c.l.	0.04	0.345

All prices per pound unless quantity is quoted.

R.C.I. has a resin emulsion to solve your problem

REICHHOLD offers an extremely diversified line of resin emulsions suitable for all the application areas discussed below. In addition, RCI has the production flexibility to tailor an emulsion to solve a specific application problem.

You can count on RCI for complete end-use data and helpful advice from a technical service staff with wide experience in this field.

ARCHITECTURAL SURFACE COATINGS – RCI offers a broad line of emulsion polymers, including vinyl acetate homopolymers and copolymers, vinyl-acrylate copolymers and straight acrylate-methacrylate copolymers. These emulsions offer the formulator maximum flexibility in meeting interior or exterior performance requirements.

INDUSTRIAL SURFACE COATINGS – Air dry or bake metal primers and finishes can be based on 1505 SYNTHEMUL alkyd emulsion. Used in conjunction with 3560 SUPER-BECKAMINE, a melamine resin, a high-quality industrial baking finish is obtained completely free of the flammability hazard. Floor paints based on 9307 WALLPOL offer high performance with particularly good abrasion resistance.

FLOOR POLISHES – RCI acrylate ester copolymer, 9431 SYNTHEMUL, is a fine particle size emulsion designed for the formulation of floor polishes with excellent gloss, clarity, and tough, long-lasting wearability. 9425 SYNTHEMUL is a similar material, somewhat softer and with better water resistance for the formulation of buffable floor polishes for industrial use. As a companion material, RCI offers 1582 WATEREZ, an alkali soluble resin which contributes excellent leveling and depth of gloss to SYNTHEMUL floor polishes.

LEATHER FINISHES – SYNTHEMUL acrylate copolymer emulsions 9401 (hard) and 9402 (soft) can be blended by the formulator of leather finishes to obtain optimum properties of low temperature flexibility, freedom from surface tack, abrasion resistance, penetration and gloss.

TEXTILES – A vinyl acetate polymer, 9350 LV PLYAMUL, is useful to the textile industry in the formulation of semi-permanent finishes (non-chlorine-retentive and non-yellowing) that impart a crisp, firm hand to fabrics. 9350 LV PLYAMUL also finds application as a binder for non-woven fabrics. 9401 and 9402 SYNTHEMUL, extremely fine particle size acrylate ester copolymers, are used as anti-crock and finishing agents. The latter, when used in finishes in conjunction with 3560 SUPER-BECKAMINE, contributes to improved dry cleaning and crease retention properties. 1530 and 1535 SYNTHEMULS are emulsifiable alkyds with excellent stability and pigment binding properties especially developed for the water-in-oil pigment printing of textiles.

PAPER COATINGS – RCI WALLPOL vinyl acetate polymers and copolymers have excellent properties for the production of clear paper coatings where greaseproof and waterproof characteristics are desired. 9401 and 9402 SYNTHEMUL acrylate copolymers have superior binding properties for pigmented and metallic paper finishes.

ADHESIVES – The broad RCI line of vinyl acetate polymers may be used alone or with plasticizers, starches, dextrines and fillers. 9350 LV and HV, 9360 and 9370 PLYAMUL are offered for professional compounding of adhesives with a wide range of end uses. 9159 PLYAMUL is a general-purpose adhesive for many varied applications, including paper converting; in woodworking, it permits quick setting with minimum clamping requirements and gives exceptional bond strength.

CEMENT ADDITIVE – Cement manufacturers should investigate the unique properties of RCI 9155 PLYAMUL. Added to cement, this modified PVAc emulsion improves bond to old masonry and to steel; permits featheredging on concrete patches; improves toughness and resilience; minimizes need for damp curing and improves tensile and compressive strength.

Contact Reichhold for technical information and for in-plant technical service on RCI Resin Emulsions. We are ready to help you select the emulsions which are best suited to your product requirements. If need be, we will work with you to develop an exclusive emulsion product for you.

REICHHOLD

Synthetic Resins • Chemical Colors • Industrial Adhesives • Phenol
Hydrochloric Acid • Formaldehyde • Phthalic Anhydride • Maleic Anhydride
Ortho-Phenylphenol • Sodium Sulfite • Pentaerythritol • Pentachlorophenol
Sodium Pentachlorophenate • Sulfuric Acid • Methanol

REICHHOLD CHEMICALS, INC.,
RCI BUILDING, WHITE PLAINS, N.Y.

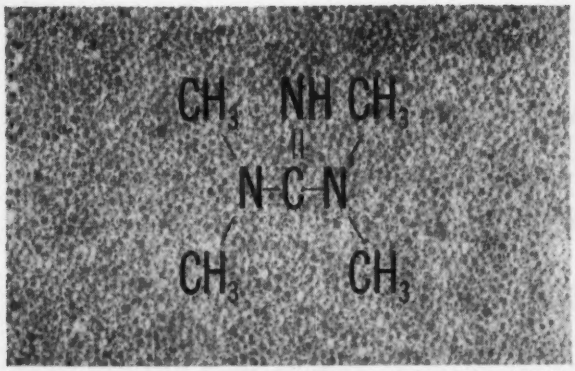
Creative Chemistry . . .
Your Partner in Progress

RCI

CYANAMID

Chemical Newsfront

"ANTI-SUNBURN LOTION" FOR PLASTICS provided by Cyanamid's new CYASORB® UV 314 ultraviolet light-absorbing chemical. *Left*—A month in the Arizona sunlight renders a sample of polyethylene brittle as an eggshell. *Right*—When protected with only 0.5% Cyasorb UV 314, the same plastic remains flexible even after *four* months in the same sunlight. Cyasorb UV 314 works same wonders for polypropylene. Fiber, sheet, film, and molded plastics can now be light-stabilized. **(Intermediates Department)**



BETTER RIGID URETHANE FOAMS—with tetramethylguanidine (TMG). Kinetic studies show TMG favorably active on price-performance basis in catalyzing primary and secondary hydroxyl reaction with NCO. Anticipated advantages include ease of handling, better cross-linking, minimum odor in final product, and possibly improved aging under high humidity. **(Market Development Department)**

NEW SALES APPEAL FOR ACRYLIC FIBERS! Five Cyanamid CALCOZINE* acrylic dyes have a history-making new look. They require no expensive retarders—no modifications that weaken light fastness. In addition they permit ease of application, simplified leveling and stripping, deep penetration and high spotting resistance. Versatile, they work well with true or modified acrylics on all types of dyeing equipment. ***Trademark** **(Dyes Department)**

ON THE CARPET! Cyanamid's ANTIOXIDANT 2246® forms only a small, but vital, part of the latex backing that locks carpet loops in place. It prevents oxidation, keeps rug coatings free of brittleness and cracking, and minimizes discoloration.

(Rubber Chemicals Department)

For further information on products in this advertisement, wire, phone—or mail this coupon to: CW-100

AMERICAN CYANAMID COMPANY
30 Rockefeller Plaza, New York 20, N. Y.

Please send me additional information on

- ☐ CYASORB UV 314 LIGHT ABSORBER
- ☐ TMG
- ☐ ANTIOXIDANT 2246
- ☐ CALCOZINE ACRYLIC DYE

Name_____

Company_____

Position or Title_____

Address_____

City_____ Zone____ State_____

CYANAMID

AMERICAN CYANAMID COMPANY
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

NOPCO

adds power to household and industrial detergents

Nopco's surface-active chemicals, emulsifiers and foam stabilizers form the base for many of today's cleaners, shampoos and dishwashing compounds. But this is only one of Nopco's many chemicals—at work. Wherever you see effective products or smoothly running industrial processes, you can expect to find one of Nopco's key ingredients.

For complete information see Chemical Materials Catalog, pages 212-213.

A skilled hand in chemistry . . . at work for you

Lubricants
Detergents
Plasticizers
Softeners
Emulsifiers
Dispersants
Wetting Agents
Defoamers
Thickeners
Metallic Soaps
Stabilizers
Vitamins
Enzymes
Foamed Plastics

NOPCO®

NOPCO CHEMICAL COMPANY

60 Park Place, Newark N.J.

Harrison, N.J. • Richmond, Calif.
Cedartown, Ga. • Boston, Mass.
Chicago, Ill. • London, Canada
Mexico, D.F. • Corbeil, France

Manufacturing Licensees throughout the World

Three Busy New Polymer Fields

Polymer	Typical use	Developer	Status
1—Polyspiroacetals	Electrical insulation Fiber	Shawinigan Chemstrand	Developmental Experimental
2—*trans*-Polyolefins	Golf ball covers Golf ball covers	Phillips U. S. Rubber	Semicommercial (Trans-4) Pilot plant
3—Polyoxetanes	Corrosion-resistant linings Electrical and chemical applications Filaments, films and other extruded shapes	Hercules Purdue Du Pont	Commercial (Penton) Developmental Experimental

New Contenders Groom for Plastics Jobs

Each of the three polymer classes listed above belongs to a new generation of now-commercial polymers. This week the newest members of the group, the polyspiroacetals, are being test-marketed by Shawinigan Resins Corp. (Springfield, Mass.) and are undergoing further research at Chemstrand Research Center, Inc. (Durham, N.C.).

The other two classes, *trans*-polyolefins and polyoxetanes, are further along, commercially, but retain high research interest. The *trans*-polyolefins, for instance, are represented commercially by Phillips Chemical Co.'s (Bartlesville, Okla.) Trans-4 (*trans*-polybutadiene). In addition, U.S. Rubber Co. has a new *trans*-polyisoprene pilot plant at Baton Rouge, La., and Phillips is also interested in the isoprene polymer. The *trans* isomers, however, have been largely obscured in the recent surge of activity concerning their chemical cousins, the *cis* isomers.

Polyoxetanes have one commercial representative, Hercules Powder Co.'s (Wilmington, Del.) Penton. But there will be more soon, as research at Purdue University and at Du Pont strongly indicates.

Stable Spiro Entry: Shawinigan's big hope in the polyspiroacetal field is a highly stable, multiple-use resin. Its principal market is expected to be in electrical insulation—it has shown up well as a wire enamel. It is also suggested as a surface-coating resin and as a chemical intermediate.

The resin, called D-430-B, is now being evaluated by prospective users. Shawinigan tells CHEMICAL WEEK that it has a "multitons/month" pilot plant that can fill laboratory evaluation orders at a developmental price of $1.15/lb. Results of these tests will be used by Shawinigan in deciding whether to build a commercial plant, which could bring the price down to 80-90¢/lb.

The stability of the resin is imparted by a highly ordered chain structure (*see p. 106*). Pentaerythritol is reacted with a dialdehyde (e.g., glutaraldehyde) to give a linear chain composed largely of cyclic acetal units. The "spiro" designation refers to the central carbon atom of the PE, which is common to two rings in the polymer. Cross-linking sites are provided for by di-PE, which makes up about 12% of "technical" pentaerythritol. Each molecule of di-PE included in the polymer supplies two hydroxyl groups. Preferred molecular weight of the resin is about 1,000; cross-linking sets the material.

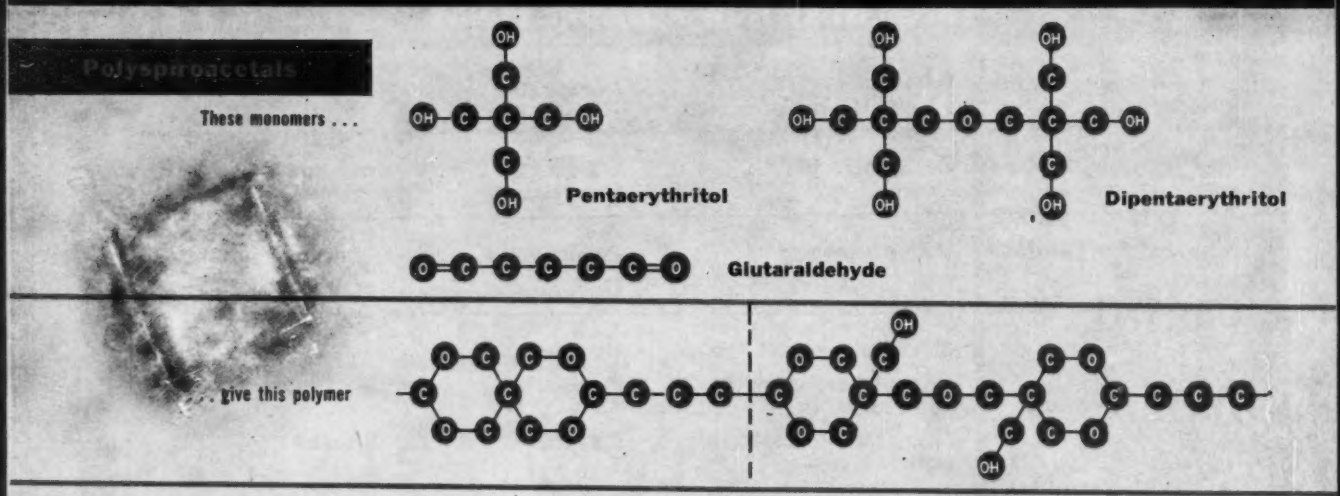
Melting point of the resin (which, with hydroxyl groups available, is a polyol) is about 220 C, and thermal stability of a typical enamel made with it is high, compared with that of other Class A insulators. Surface coatings are also reported to show high resistance to abrasion and solvents, although solvent resistance causes some difficulty in processing, since the resin is insoluble in most common solvents. Cresylic acid and phenol are the only two solvents listed by the company for use at room temperature, while furfuryl alcohol, dimethyl sulfoxide and pyrrolidone all work at higher temperatures.

Other uses for the resin depend on its similarities to pentaerythritol; the resin is a versatile polyol that can be used in a number of systems where the added properties of a short-chain, stiff polymer molecule are needed.

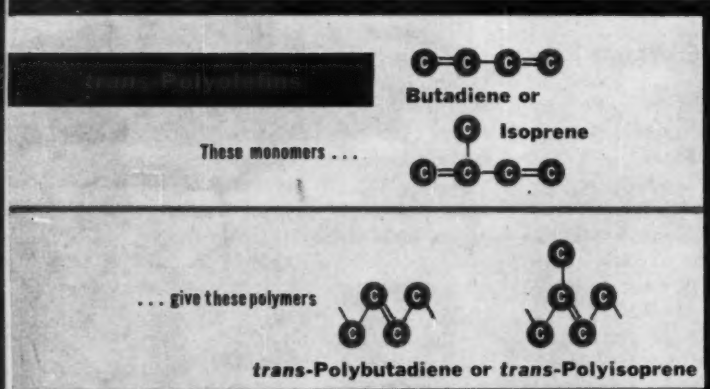
Shawinigan expects a U.S. patent on its resin in December; meanwhile it has foreign coverage (e.g., Australian Patent 225,640). And a string of recent Australian patent applications cover various curing systems and other aspects of the resin. A key one: 47,768/59.

Other companies are working on the polyspiroacetals, but with different applications in mind. Chemstrand, for instance, visualizes possible fiber applications for its material. The Chemstrand development, which

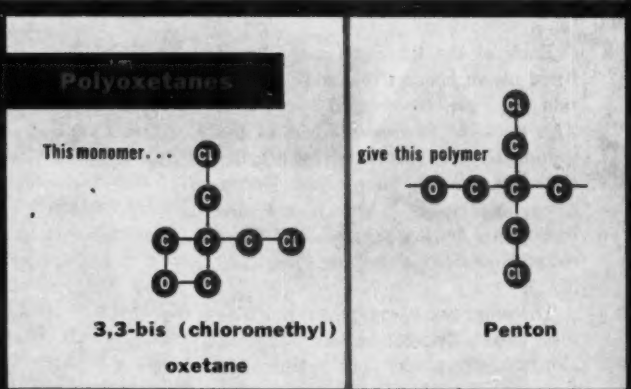
Building the New Polymers



Shawinigan copolymerizes technical pentaerythritol (a mixture of the mono- and di- versions of PE) with glutaraldehyde. Product is a highly stable linear polymer that can be cross-linked at the hydroxyl groups (whose frequency is determined by the proportion of di-PE in the starting mixture).



By careful control of reaction conditions, diolefins can be polymerized to give stereoregular products that are high in the *trans* isomer as well as the better-known *cis* form.



Hercules' Penton is a linear polyether made by polymerizing an oxetane. Other oxetanes (four-membered cyclic ethers) can be polymerized to give a variety of products.

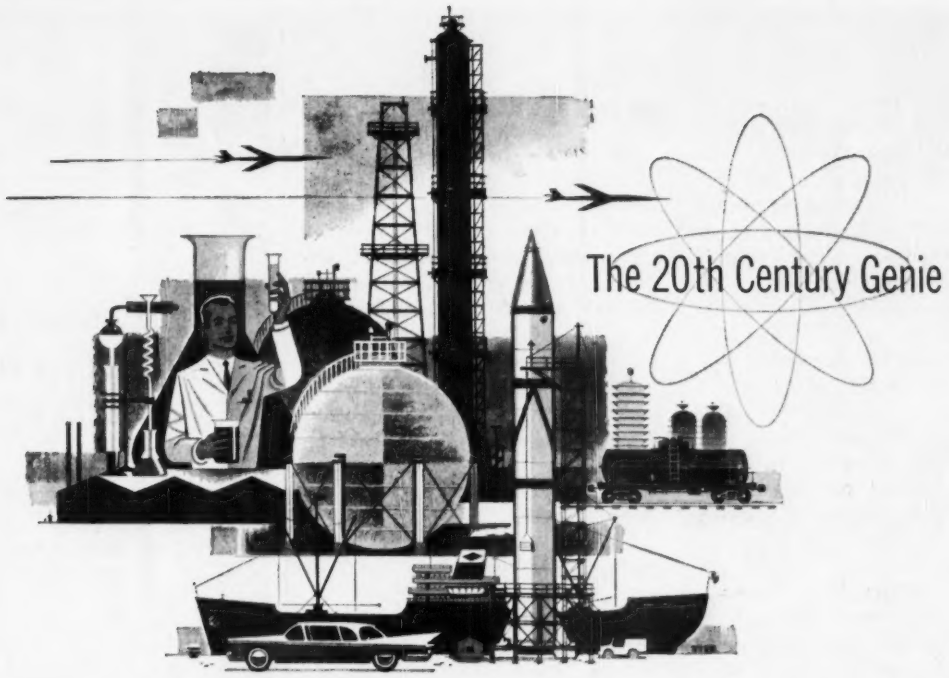
is still in the experimental stage, is described in U.S. Patent 2,889,290.

Like Shawinigan, Chemstrand uses glutaraldehyde but prefers to make longer chains without the hydroxyl side groups (evidently requiring the use of pure monopentaerythritol as the other starting material). In addition, glutaraldehyde is transformed into the tetraethyl acetal before reacting with the PE. The final chain structure, however, is the same as the left-hand portion of that shown in the diagram (*above*) of Shawinigan's polymer.

Growing 'Little Brothers': The *trans*-polyolefins, commercially "little brothers" of their *cis* counterparts, now have the active attention of at least two firms. U.S. Rubber recently said its new pilot plant at Baton Rouge—with a capacity of over 1 ton/day—will be used initially for production of *trans*-polyisoprene, the synthetic version of natural balata, a very tough rubber used mainly in making golf ball covers. Earlier this year Phillips started semicommercial production of *trans*-polybutadiene, also a rubber with properties similar to those of natural balata rubber.

Phillips reports that it is selling "substantial tonnage" of Trans-4, looks for larger markets once costs are cut. Current price tag on *trans*-polybutadiene is $2.50/lb., putting it out of competition for such uses as cable covering, belting, shoe soles and floor tile. Even this price is highly favorable, though, compared with balata's current $5/lb. quotation. Larger-scale production is counted on to make the cost differential between the two materials even greater.

The cost picture in *trans*-polyiso-



HARSHAW FLUORIDES

One of the largest facilities in the world for the manufacture of fluorides makes available a long list of Harshaw quality fluorine compounds. If required, you are invited to draw on the knowledge and experience of our staff of technical specialists on fluorides. We have a background of more than forty years experience as a major producer.

BORON TRIFLUORIDE
HYDROFLUORIC ACID
ANHYDROUS . . . AQUEOUS

Ammonium Bifluoride
Ammonium Fluoborate
Antimony Trifluoride Sublimed
Barium Fluoride
Bismuth Fluoride
Boron Trifluoride
Boron Trifluoride Complexes
Cadmium Fluoborate
Chromium Fluoride
Copper Fluoborate
Fluoboric Acid
Fluorine Cells
Fluorinating Agents
Frosting Mixtures
Hydrofluoric Acid Anhydrous
Hydrofluoric Acid Aqueous
Hydrofluosilicic Acid
Lead Fluoborate
Lithium Fluoride
Metallic Fluoborates
Nickel Fluoborate
Potassium Bifluoride
Potassium Chromium Fluoride
Potassium Fluoborate
Potassium Fluoride
Potassium Titanium Fluoride
Silico Fluorides
Sodium Fluoborate
Tin Fluoborate
Zinc Fluoborate
Zinc Fluoride

HARSHAW

THE HARSHAW CHEMICAL CO.
1945 EAST 97TH STREET • CLEVELAND 6, OHIO

CHICAGO • CINCINNATI • CLEVELAND
DETROIT • HASTINGS-ON-HUDSON, N.Y. • HOUSTON
LOS ANGELES • PHILADELPHIA • PITTSBURGH

prene is likely to be even more of a barrier. U.S. Rubber hasn't made any firm price quotation for the output of its new pilot plant, but estimates are "several dollars" per pound and the company indicates that it may still have to find a way to beat balata's price. Phillips has also worked on the isoprene product, hasn't made plans to produce it.

Oxetane Hopefuls: Processing difficulties have been the big drawbacks to success of the other family of hopeful polymers, the polyoxetanes. Recently, however, a number of routes have been worked out to simplify production of the four-membered-ring monomers.

Hercules developed a process, starting with pentaerythritol, for making 3,3-bis (chloromethyl) oxetane. When polymerized, this material gives a symmetrical, chlorinated polyether that's highly resistant to chemicals and has good heat resistance. This is the Penton resin Hercules has sold commercially for over a year.

Purdue University also has a stake in the oxetane field through the work of Professor L. C. Case and a former student, L. F. Schmoyer. Case has reported a simple method of producing oxetanes directly from 1,3-diols. Neopentyl glycol, for instance, becomes 3,3-dimethyloxetane when it has been dissolved in concentrated sulfuric acid, neutralized and distilled. Research Corp. (New York) has patent rights to the process (a U.S. patent has been applied for) and is investigating possibilities of licensing it. Boron trifluoride is used to catalyze polymerization of the oxetanes.

Du Pont has also shown its interest in oxetanes, although the firm says that its work is definitely in the early stages of research. Du Pont's U.S. patent 2,891,837 describes the forming of a shaped structure by chemical spinning. The chemical is a 3,3-bis (substituted methyl) oxetane, whose polymerization is catalyzed by phosphorus pentafluoride. Products that can be made by this method include filament, ribbon, film, tube, or other extruded shapes.

Just Sampling: These three polymer classes make up the front guard of the new generation of polymers. But research in countless laboratories is already supplying still newer hopefuls that are looking for a place as standard commercial products.

Biochemical Progress

New gains in biochemical and medical research this week include a time-saving approach to studying amino acids in protein; a new method for measuring oxygen directly in the human body; progress in making injectable steroids; and success of fluorescence microscopy in detecting rabies.

The difficult job of calculating the sequence of amino acids in proteins —important in research in biochemistry and genetics—can now be handled by a computer, according to National Institute of Mental Health researchers Sidney Bernhard and Dan Bradley, and William Duda of International Business Machines Corp. (New York). They developed a method of calculation, using an IBM 7090 computer, and expect that the sequencing time can be cut to as little as 10% of the time required by present procedures (often several years).

Squibb Institute for Medical Research (New Brunswick, N.J.) discloses it is using a Micronizer mill designed by the Sturtevant Mill Co. (Dorchester 22, Mass.) for making research quantities of injectable hormones. The mill breaks down crystal particles to 40 microns or finer by interimpacting them in jets of oil-free air (the mill has no moving parts).

In-Vivo Tests: A tiny electrode that makes it possible for the first time to directly measure oxygen in the human body has been developed by Beckman Instruments, Inc. According to William Calhoun of Beckman's Spinco Division (Palo Alto, Calif.), use of the electrode can help shed light on the relationship of oxygen to life processes.

The platinum-tipped electrode (0.0005 in. in diameter) is incorporated in a medical instrument called the Physiological Gas Analyzer, can be inserted into blood vessels or the brain. "Early experiments conducted with the instrument suggest there is a correlation between oxygen levels in the brain and the mental erosion which characterizes senility," says Calhoun.

Light on Rabies: A new method of checking for rabies virus in animal brain is reportedly faster and more accurate than the present (Negri) test. It's called the fluorescent rabies antibody (FRA) technique, and has been

Interested personal service—
always—
when you buy from Eastman

Eastman Gasoline Additives

Tenamene 1
An aminophenol. Low cost, efficient gum inhibitor for motor fuel.

Tenamene 2
A phenylenediamine. A versatile gum inhibitor for motor fuels and aviation gasolines. Also acts as a sweetening agent in many catalytically cracked stocks.

Tenamene 3
An alkylated phenol. Efficient gum inhibitor for motor fuels, aviation gasolines and jet fuels.

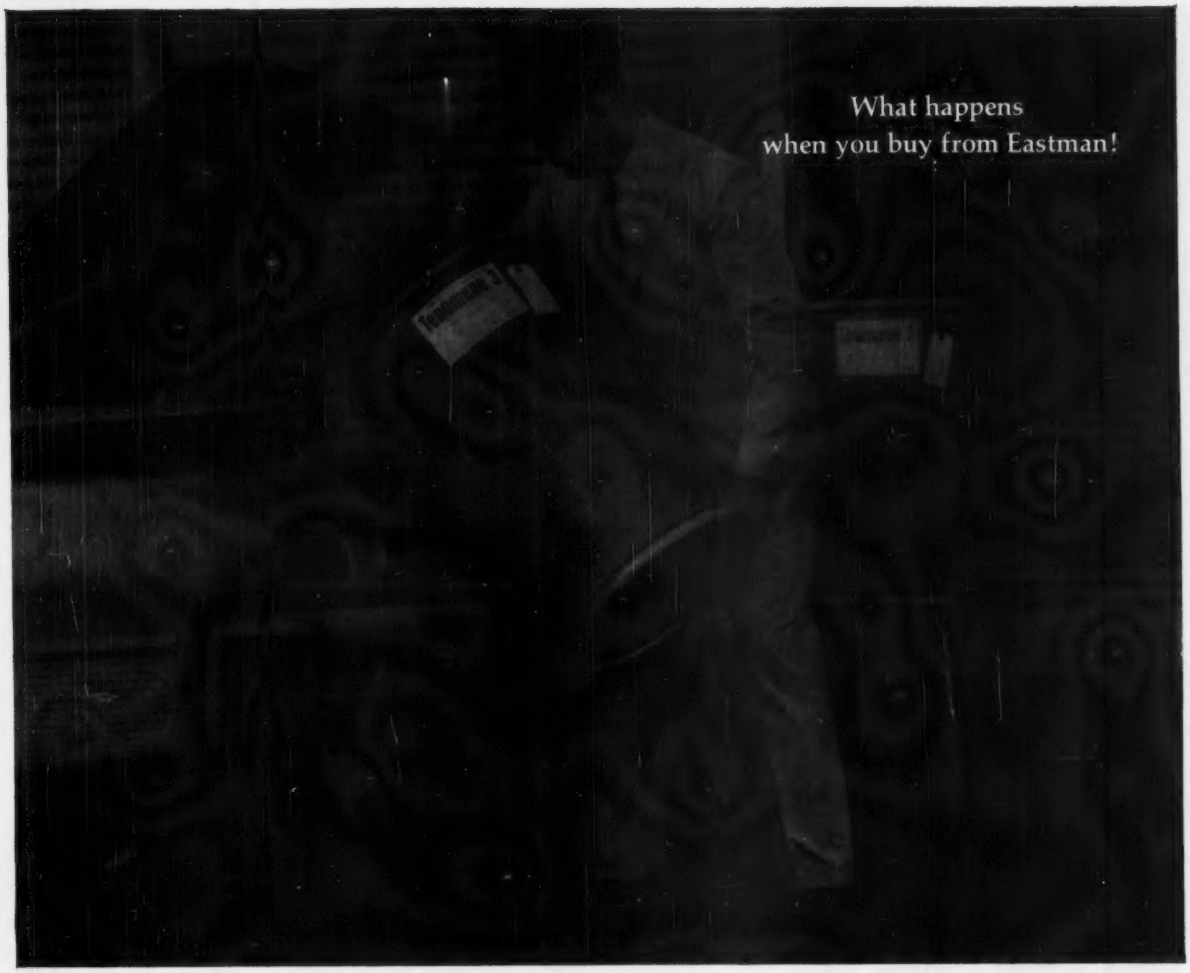
Tenamene 60
A powerful copper deactivator.

Tenamene MD 50
A freeze-resistant solution containing copper deactivator.

For information on how to use Tenamene gasoline additives, send for Bulletin I-106.

For properties and shipping information on these and other Eastman products, see **Chemical Materials Catalog**, page 395, or **Chemical Week Buyers' Guide**, page 107.

Eastman



"A trunkful of gasoline inhibitor..."

"That's what he said," reports one of our sales representatives—"trunkful. And after removing fishing gear, debris from last year's vacation, plus my spare tire, that's what he got, in the form of two drums of Tenamene 3.

"The first part of the purchasing agent's late evening call was a soliloquy on the aberrations of suppliers in general. I agreed that a supplier who confused ditertiary butyl_____ (name withheld to protect the innocent) with ditertiary buty cresol (Tenamene 3*) was a bit loose in the order-writing department. At the same time I was quietly glad that we do not sell the ditertiary butyl derivative of _____. It can happen, you know.

"Anyway that's what had happened. When they were ready to stabilize a run of aviation gasoline, a sharp foreman stopped the operation before the gasoline was adulterated rather than stabilized, since as a gasoline inhibitor the _____ derivative, being insoluble, doesn't even so much as contact the problem.

"To keep gum formation from getting a head start, I went out to our local warehouse at 4:30 A.M., loaded two 100-pound drums of flake Tenamene 3 in the trunk of my car, and took off with a little prayer that there were no loose nails in the road.

"There weren't, and I arrived at the customer's refinery at 9:00 A.M."

Normally, we move Tenamene inhibitor around the country by rail freight or truck transport. If possible we'd like to continue this practice. In an emergency, however, we're prepared to give our customers maximum personal service.

Sometimes, this personal service even includes personal delivery.

*Eastman's gasoline inhibitor grade of 2,6-ditertiary butyl p-cresol.

Eastman CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE, Subsidiary of Eastman Kodak Company

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Boston; Buffalo; Chicago; Cincinnati; Cleveland; Detroit; Greensboro, North Carolina; Houston; Kansas City, Missouri; New York City; Philadelphia; St. Louis.
West Coast: Wilson & Geo. Meyer & Company, San Francisco, Los Angeles; Portland; Salt Lake City; Seattle

A BASIC PRODUCER FROM MINE TO FINISHED PRODUCT
SERVING THE GREAT SOUTHEAST

The Sulfur contained in the ore we process yields Virgin Sulfuric Acid of highest quality—We produce all grades and strengths of Sulfuric Acid from 60° Baume through the various Oleums.

For complete listing of our products see our inserts
in CHEMICAL WEEK BUYERS' GUIDE, Pages 173-176
or CHEMICAL MATERIALS CATALOG, Pages 551-554.

TC TENNESSEE CORPORATION
612-629 Grant Building, Atlanta 3, Georgia

KESSLER

ESTERS FOR INDUSTRY
Since 1921

EMULSIFIERS
Glycerol Monostearate, Diglycol Stearate, Diglycol Laurate, Propylene Glycol Monostearate, Diethylene Glycol Monostearate, Polyethylene Glycol Esters

EMOLLIENTS
Isopropyl Myristate, Isopropyl Palmitate, Isopropyl Stearate, Isocetyl Esters, Butyl Stearate

OPACIFIERS
Ethylene Glycol Monostearate, Glycerol Monostearate, Diethylene Glycol Monostearate, Polyethylene Glycol Stearates

WETTING AGENTS
Polyethylene Glycol Esters

SOLVENT OILS
Isopropyl Myristate, Isopropyl Palmitate, Triacetin, Butyl Stearate

FOAM STABILIZERS
Fatty Alkylolamides

VISCOSITY CONTROL AGENTS
Fatty Alkylolamides, Polyethylene Glycol Esters

Call or write our Technical Service Laboratory

KESSLER CHEMICAL CO., INC.
State Road & Cottman Avenue, Philadelphia 35, Pa.

evaluated over a two-year span on 1,332 fresh or frozen brain specimens submitted to the Florida State Board of Health for examination. In the test, antirabies globulin solutions are treated with fluorescein isothiocyanate. These tagged antibodies are added to smears of brain tissue, fluoresce under ultraviolet light if the tissue is infected.

Fluorescence microscopy is gaining widespread application in diagnosing cancer and solving immunization problems in medicine and biochemistry, according to reports this week at the Tenth Annual Instrument Symposium and exhibit at the National Institutes of Health (Bethesda, Md.). A new fluorescence microscope displayed at the exhibit by E. Leitz, Inc. (New York) detects as little as 10^{-18} gm. of fluorescent matter.

Bell's Bright Light

Bell Telephone Laboratories last week unveiled its activity in the field of optical masers, the light amplification devices first developed by Hughes Aircraft Co. (*CW Technology Newsletter, July 16*). Among the long-range applications foreseen by Bell: high-intensity infrared sources, initiation of specific chemical reactions.

First proposed in '58 by Bell's Arthur Schawlow and C. H. Townes (now at Columbia University), the optical maser is a high-frequency version of the better-known microwave maser. (Hughes' Theodore Maiman calls the optical type a "laser" to distinguish the light wave and microwave versions.)

Bell Laboratories holds a recent patent on an optical maser communications system (U.S. 2,929,922) and has recently completed a series of experiments in which maser-produced light signals were sent between two New Jersey laboratories 23 miles apart. Present crystal being used is pink ruby, but others are under development, as are gaseous masers.

Main features about the maser light beam are that it is: (1) 60 times closer to being truly monochromatic than is spontaneous ruby fluorescence; (2) highly directional, with the present beam forming only a 0.1-degree angle; (3) "coherent," which means that the signal can be modulated or controlled as an information-carrying medium, as are radio waves.

SIVA third of the major Hindu deities, represents the principles of destruction and restoration. Among his many aspects, he is the worker of miracles, the great ascetic and the god of the arts.

Destroyer of harmful acids, caustic soda works miracles in many reactions that help create a host of useful products — from soaps to starches, from petroleum to textiles. Frontier supplies liquid and flake caustic soda from its Wichita, Kansas, and Denver City, Texas, plants to many users throughout Mid-America. We shall be happy to serve you.

FRONTIER CHEMICAL COMPANY

division
VULCAN MATERIALS COMPANY

CAUSTIC SODA

P. O. BOX 545 WICHITA, KANSAS

NOW--
Seal Cans in a Jiffy
WITH POST OFFICE APPROVED
FREUND TRIPLE-GRIP CAN CLIPS

1 Hook clip under the rim of the can...and...press into lid groove with fingers.

2 Straddle the clip with the applicator...and...hook rim grip under rim of can.

3 Move the applicator upward--pressing the clip firmly into the lid groove of can.

Anyone can easily and quickly apply Freund Triple-Grip Can Clips. No skill, no experience required.

Simple illustrated instructions show how. And, the cost is only pennies per can. For convincing proof, send for special Try-It Kit and test in your plant--100 clips for gallon cans, 100 for quart and smaller cans, special applicator tool, and low quantity prices--post paid $7.50.

Mail purchase order today--your Try-It Kit will be shipped immediately.

FREUND CAN COMPANY
4445A Cottage Grove Ave. • Chicago 53, Ill.

AMINES
Monoethanolamine - Diethanolamine - Triethanolamine - Diethylamine - Triethylamine - Butylamine - Isopropylamine - Morpholine - Diisopropylamine - Diethylene Triamine

GLYCOLS
GLYCOL ETHERS
CHLORINATED SOLVENTS
KETONES • ESTERS • AMINES
PLASTICIZERS • AROMATIC SOLVENTS
SURFACE ACTIVE AGENTS • ALCOHOLS
ALIPHATIC NAPHTHAS • POLYETHYLENE GLYCOLS

CS CHEMICAL SOLVENTS, INC.
60 PARK PLACE, NEWARK 2, N. J.
WOrth 2-7763 (N.Y.) MArket 2-3650 (N.J.)

RESEARCH

New Fuel Cell

Storage capabilities up to 10 times greater than those of conventional batteries are claimed for an experimental, lightweight, regenerative fuel cell developed by Electro-Optical Systems, Inc. (Pasadena, Calif.). It's said to be adaptable to zero gravity conditions in satellites and space vehicles, might power future aircraft or automobiles.

The new cell uses hydrogen and oxygen as fuel. The oxygen electrode is made of porous nickel coated with nickel and lithium oxides; the hydrogen electrode consists of sintered nickel. As the gases combine, energy is released, and the water formed is taken up by potassium hydroxide solution. When charging (e.g., in sunlight) the chemical process is reversed.

EXPANSION

• The Institute of Measurement Science, first of its kind in the U.S., will be established at George Washington University (Washington, D.C.) with the support of the National Bureau of Standards and The Martin Co. (Baltimore, Md.).

• Union Carbide is building a multimillion-dollar addition to its technical center at South Charleston, W. Va. Completion of the new facility is scheduled for '62. Most of the laboratories in the main building will be occupied by Union Carbide Olefins Co.

• National Beryllia Corp. (North Bergen, N.J.) has staffed and equipped a new laboratory for wet-chemical trace analysis. Philip Hessinger, manager of research, says the new facilities will enable the firm to furnish ceramics of high-purity sintered beryllia and eventually other metal oxides containing only a few parts per million of impurities.

• A new, $1-million U.S. Forest Service forest fire laboratory is now in operation at Missoula, Mont. Included: chemistry laboratories for research on combustion and fire extinguishing.

• Hazleton Nuclear Science Corp. (Palo Alto, Calif.) is the newly formed affiliate of Hazleton Laboratories (Falls Church, Va.) and the Nuclear Science and Engineering Corp. (Pittsburgh, Pa.). It offers clients a range of chemical services.

• Bio-Rad Laboratories (Rich-

New member of the Oncor® family–23A...

A unique pigment for flame retardance in halogenated plastics and paints

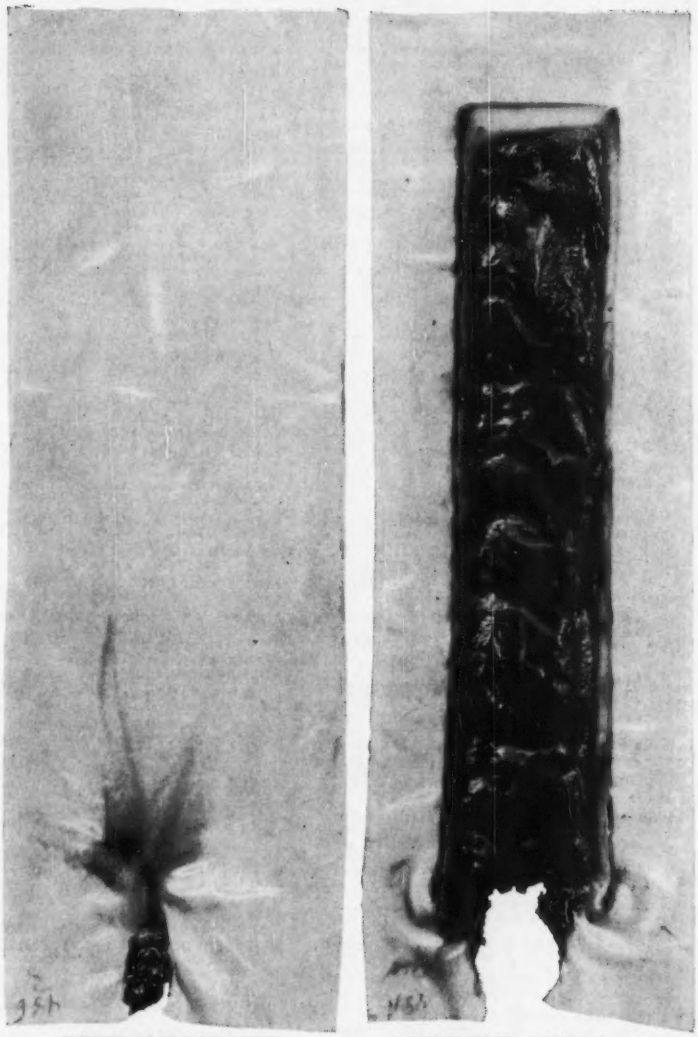
Never before has there been a pigment like ONCOR® 23A, developed especially for compositions based on halogenated resins. This pigment is composed of an inert silica core of low specific gravity, and has a surface layer of antimony oxide fused to the core.

Here's a quick run-down on the outstanding features of this significant new ONCOR pigment:

1. **Effective Flame Retardance** – ONCOR 23A pigment compares favorably with conventional antimony oxides in flameproofing efficiency in halogen-containing resins for plastics and paints. In tests on vinyl films, ONCOR 23A pigment has given equivalent flame resistance compared to conventional antimony oxide, on an equal weight basis.
2. **Low Tinting Strength** – ONCOR 23A pigment has a low and uniform tinting strength. In vinyl film tests, tinting strength consistently measures between 60% and 65% of a conventional antimony oxide standard. This allows most effective use of colorants.
3. **Low Specific Gravity** – Because of its special physical structure, ONCOR 23A pigment has a lower specific gravity than regular antimony oxides. This means a higher volume yield per pound of pigment.
4. **Excellent Dispersion Characteristics**–as a result of careful production controls, ONCOR 23A pigment has a particularly uniform particle. This assures consistently good dispersion in both plastics and paints.

ONCOR 23A pigment is suggested for use in all halogenated plastic and paint compositions requiring flame resistance. It may be used with polyvinyl chloride, vinyl chloride copolymers, chlorinated paraffins, chlorinated rubber, chlorosulfonated polyethylene, chlorinated polyesters and the commercial fluoropolymers.

Additional information on the new ONCOR 23A pigment is provided in the National Lead Company Data Sheet just off the press. The handy coupon at the right will bring you a copy by return mail.



WITH ONCOR 23A **WITHOUT ONCOR 23A**

These two samples show typical flammability test results on vinyl film, following the procedure specified in ASTM D-1433-58. (See Item 1 in text.)

KC-6295

National Lead Company: General Offices, 111 Broadway, New York 6, N.Y. In Canada: 1401 McGill College Avenue, Montreal.

Gentlemen: Please send your new Data Sheet for ONCOR® 23A, antimony silico oxide pigment for flame retardance in halogenated plastics and paints.

Name _____ Title _____

Company _____

Address _____

City & Zone _____ State _____

23A an **oncor®** *Pigment...A Development of* **National Lead Company**

General Offices: 111 Broadway, New York 6, N.Y.

CHEMICAL WEEK • ADVERTISERS' INDEX

OCTOBER 15, 1960

*ALLIED CHEMICAL CORP., BAKER & ADAMSON DIV. ..... 3rd cover
Agency—Kastor, Hilton, Chesley, Clifford & Atherton, Inc.

ALUMINUM CO. OF AMERICA 11
Agency—Ketchum, MacLeod & Grove, Inc.

AMERICAN CYANAMD CO. 102-103
Agency—Erwin Wasey, Ruthrauff & Ryan, Inc.

AMERICAN CYANAMID CO., PROCESS CHEMICALS DEPT. 13
Agency—Erwin Wasey, Ruthrauff & Ryan, Inc.

AMERICAN MINERAL SPIRITS CO. ... 52-53
Agency—Leo Burnett Co., Inc.

*AMERICAN POTASH & CHEMICAL CORP. 40
Agency—The McCarty Co.

AMOCO CHEMICAL CORP. 14
Agency—DArcy Advertising Co.

ANSUL CHEMICAL CO. 96
Agency—Brad Sebstad, Inc.

ATLANTIC COAST LINE RAILROAD 82
Agency—Tucker Wayne & Co.

BENDIX-COMPUTER 8
Agency—Shaw Adv., Inc.

BIRD MACHINE CO. 15
Agency—Walter B. Snow & Staff, Inc.

CATALYTIC CONSTRUCTION CO. 46
Agency—B. Franklin Eshleman Co.

*CELANESE CORP. OF AMERICA 35
Agency—Ellington & Co., Inc. ?

CHEMICAL CONSTRUCTION CORP. 29
Agency—Van Brunt & Co.

CHEMICAL MFG. CO. 54
Agency—Geyer, Morey, Madden & Ballard, Inc.

CHEMICAL SOLVENTS, INC. 112
Agency—Asher, Godfrey & Franklin, Inc.

CHEMICAL WEEK BUYERS' GUIDE 65

CHURCH & DWIGHT CO., INC. 32
Agency—Charles W. Hoyt Co., Inc.

CLUPAK, INC. 58
Agency—Lennen & Newell, Inc.

COLUMBIA SOUTHERN CHEMICAL CORP. 56-57
Agency—Ketchum MacLeod & Grove, Inc.

*CONTINENTAL OIL CO. 67
Agency—Benton & Bowles, Inc.

COOPER-BESSEMER CORP. 77
Agency—The Griswold-Eshleman Co.

CUSTOM POLYMERS, INC. 9
Agency—Frank C. Nahser, Inc.

DURIRON CO., THE ..... 4th cover
Agency—Odiorne Industrial Adv. Co.

*EASTMAN CHEMICAL PRODUCTS, INC. 108-109
Agency—Fred Wittner Co.

ETHYL CORP. 2
Agency—Beach, McClinton & Co., Inc.

FISHER SCIENTIFIC CO. 64
Agency—Fuller & Smith & Ross, Inc.

*FOOTE MINERAL CO. 12
Agency—The Harry P. Bridge Co.

FREUND CAN ACCESSORIES DIV. OF FREUND CAN CO. 112
Agency—J. L. Cunningham & Co.

FRONTIER CHEMICAL CO. 111
Agency—The McCormick-Armstrong Co.

*FULLER CO., THE 4
Agency—O. S. Tyson & Co., Inc.

GENERAL AMERCAN TRANSPORTATION CORP. 10
Agency—Edward H. Weiss & Co.

GLIDDEN COMPANY, THE 6
Agency—Meldrum & Fewsmith, Inc.

HALL CO., THE C. P. 62
Agency—Cruttenden Advertising, Inc.

HARSHAW CHEMICAL CO. 107

HEDWIN CORP. 33
Agency—The Barton-Gillett Co.

HERCULES POWDER CO. 51
Agency—Fuller & Smith & Ross, Inc.

IMPERIAL COLOR CHEMICAL & PAPER CORP. 43
Agency—James R. Flanagan Adv. Agency

INTERNATIONAL PAPER CO. 93
Agency—Ogilvy, Benson & Mather, Inc.

*JEFFERSON CHEMICAL CO. 16
Agency—Robinson, Gerard, McGary, Inc.

KENTUCKY DEPT. OF ECONOMIC DEVELOPMENT 49
Agency—Doe-Anderson Adv Agency

KESSLER CHEMICAL CO. 116
Agency—Willard G. Myers Adv. Agency

*MONSANTO CHEMICAL CO. 68-69
Agency—Needham, Louis & Brorby, Inc.

MORTON SALT CO. 19
Agency—Needham, Louis & Brorby, Inc.

NATONAL ENGINEERING CO. 90
Agency—Russell T. Gray, Inc.

NATIONAL LEAD CO. 113
Agency—Marschalk & Pratt Co., Inc.

NORTH AMERICAN CAR CORP. 1
Agency—Roche, Rickerd & Cleary, Inc.

*NOPCO CHEMICAL CO. 104
Agency—Gray & Rogers Adv.

OLIN MATHIESON CHEMICAL CORP. 44-45
Agency—Doyle, Kitchen & McCormick, Inc.

OWENS ILLINOIS GLASS CO. 97
Agency—J. Walter Thompson Co.

PENICK CO., S. B. 63
Agency—James J. McMahon Adv.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP. 79
Agency—Downing Industrial Adv., Inc.

PETRO-TEX CHEMICAL CORP. 98
Agency—James J. McMahon, Inc.

PFIZER & CO., INC., CHAS 5
Agency—MacManus, John & Adams, Inc.

PITTSBURGH CHEMICAL CO. 31
Agency—Erwin Wasey, Ruthrauff & Ryan, Inc.

*REICHHOLD CHEMICALS, INC. 101
Agency—MacManus, John & Adams, Inc.

RISDON MFG. CO. 36
Agency—Emil, Mark & Co.

*ROHM & HAAS CO. 39
Agency—Arndt, Preston, Chapin, Lamb & Keen, Inc.

SHELL CHEMICAL COMPANY 85-88
Agency—J. Walter Thompson Co.

SHELL OIL COMPANY 73
Agency—J. Walter Thompson Co.

SILICONES DIV. OF UNION CARBIDE CORP. 62
Agency—J. M. Mathes, Inc.

*SINCLAIR PETROCHEMICALS, INC. 20
Agency—Geyer, Morey, Madden & Ballard, Inc.

*STAUFFER CHEMICAL CO. 60-61
Agency—John Mather Lupton Co.

STROHMEYER & ARPE CO. 96
Agency—J. M. Kesslinger & Assoc.

SWIFT & CO. 83
Agency—Russell T. Gray, Inc.

*TENNESSEE CORP. 110
Agency—Crawford & Porter, Inc.

TEXAS GULF SULPHUR CO. 37
Agency—Sanger Funnell, Inc.

*TRUBEK LABORATORIES, THE . 2nd Cover
Agency—Ray Ellis Advertising

UNION CARBIDE CHEMICALS CO., DIV. OF UNION CARBIDE CORP. 91
Agency—J. M. Mathes, Inc.

U.S. RUBBER COMPANY 84, 94
Agency—Fletcher Richards, Calkins & Holden, Inc.

U. S. TESTING CO. 92
Agency—W. L. Towne Co., Inc.

VANDERBILT CO., R. T. 66
Agency—Pearsall & Schael

VITRO ENGINEERING CO. 95
Agency—Sam J. Gallay Adv.

WEIGHING AND CONTROLS, INC. 78
Agency—Thomas R. Sundheim Adv., Inc.

WELLINGTON SEARS 55
Agency—Ellington & Co., Inc.

WILLIAMS & CO., C. K. 38
Agency—William A. Hatch, Inc.

*WITCO CHEMICAL CO. 80-81
Agency—Hazard Adv.

WORTHNGTON CORP. 70
Agency—Needham, Louis & Brorby, Inc.

TRACERS SECTION

(Classified Advertising)

F. J. Eberle, Business Mgr.

BUSINESS OPPORTUNITIES 115

CHEMICALS For Sale/Wanted 115

EMPLOYMENT 115

EQUIPMENT: Used/Surplus New For Sale 115

SELLING OPPORTUNITIES Offered/Wanted 115

ADVERTISING STAFF

Atlanta 3 ..... Michael Miller, 1301 Rhodes-Haverty Bldg., JAckson 8-6951

Boston 16 ... Paul F. McPherson, Copley Square, COngress 2-1160

Chicago 11 ..... Alfred D. Becker, Jr., R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800

Cleveland 13 ... H. J. Sweger, Duncan C. Stephens, 1164 Illuminating Bldg., 55 Public Square, SUperior 1-7000

Dallas 1 ..... Gordon Jones, John Grant, 901 Vaughan Bldg., 1712 Commerce St., Riverside 7-9721

Denver 2 ... J. Patten, 1740 Broadway, ALpine 5-2981

Detroit 26 ..... H. J. Sweger, Jr., 856 Penobscot Bldg., WOodward 2-1793

Frankfurt/Main ..... Stanley Kimes, 85 Westendstrasse, Germany

Geneva ..... Michael R. Zeynel 2 Place du Port, Geneva, Switz.

Houston 25 ..... Gene Holland, W-724 Prudential Bldg., JAckson 6-1281

London E.C. 4 ..E. E. Schirmer, N. Murphy, McGraw-Hill House, 95 Farringdon St., England.

Los Angeles 17 ..... Robert Yocom, 1125 West Sixth St., HUntley 2-5450

New York 36 ..... Charles Haines, B. A. Johnson, P. E. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959

Philadelphia 3 ....William B. Hannum, Jr., J.E.B. Ladouceur, 6 Penn Center Plaza, LOcust 8-4330

Pittsburgh 22 ..... Duncan C. Stephens, 4 Gateway Center, EXpress 1-1314

Portland 4 ... Scott B. Hubbard, Room 445, Pacific Bldg.

St. Louis 8 ..... R. J. Claussen, 3615 Olive St., Continental Bldg., JEfferson 5-4867

San Francisco 4 ..... William C. Woolston, 68 Post St., DOuglas 2-4600

***For complete product data see catalog unit in the BUYERS' GUIDE ISSUE for 1959-60**

mond, Calif.) has added a new service: computer solutions of chemical and physical research problems. Available computers include the IBM 704 and 650; a 7090 will be available soon, is expected to cut many 704 computing costs in half.

• General Research & Development, a division of Buchart Engineering Corp. (York, Pa.), is a new organization that offers broad-base R&D services to industry. The staff is composed of specialist consultants in a wide number of technical fields, who are ready to work on a project team geared to needs of each client.

• Molybdenum Corp. of America plans to expand its rare-earth research now being carried out at Pennsylvania State University.

PRODUCTS

Organometallics: MacKenzie Chemical Works (Central Islip, N.Y.) now offers laboratory quantities of indium acetylacetonate and ferrous acetylacetonate for research use.

•

Biochemical: For research in carbohydrate metabolism and photosynthesis, ribose 5-phosphate, sodium (RFS) is now offered by Schwarz BioResearch, Inc. (Mount Vernon, N.Y.). This highly pure sodium salt replaces the less useful barium salt, which the firm has discontinued.

•

Packing: Calcined diatomaceous earth has been developed for use in chromatographs by Applied Science Laboratories, Inc. (140 North Barnard St., State College, Pa.). Called Gas-Chrom, the support is said to permit high gas flow rates without deterioration, is also available coated with commonly used liquid phases.

•

Boron Hydrides: Pentaborane and decaborane are now available in experimental quantities from the Energy Division of Olin Mathieson Chemical Corp. (New York). Prices (depending on quantity): $157-357/lb. for pentaborane; $223-320/lb. for decaborane.

•

Tracer Find: New England Nuclear Corp. (Boston) is now offering thymidine-methyl-H^3, a specific tracer that can be used in studies of cell growth and genetic patterns. It's a precursor of both ribonucleic acid and desoxyribonucleic acid.

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

Published: each Saturday—closes 11 days in advance.

Rate—$3.00 per line ($1.50 per line for position wanted ads), minimum 3 lines. Allow 5 average words as line; Count one half line for box number.

ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication. Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

POSITIONS VACANT

Chemical Commercial Development-Market Research—Opportunity for a product oriented chemist or chemical engineer with broad knowledge of the chemical industry is open. Experience in Commercial Development desirable but not necessary. Knowledge of polymer technology would be beneficial. Reply directly to: Manager, Personnel Relations, The Richardson Company, 27th Avenue & Lake Street, Melrose Park, Illinois.

Polyester Resin Chemist: experienced in formulation and application of resins for hand-lay-up, matched metal molding preform and premix. Salary commensurate with experience. Contact American Alkyd Industries, Carlstadt, New Jersey—Geneva 8-4332.

Chemist-Unusual opportunity with established, fast growing chemical specialty manufacturer, servicing the Textile and Paper Industries. We want a man with imagination and drive, to expand our research and product development program. Location New England. Give full resume of background in first reply which will be held in confidence. P-5455, Chemical Week.

Market Research and Development—chemical degree, organic chemistry and several years market research experience required. Business training desirable. Evaluation of markets on proposed products through their commercial development. Will report to management with liason with all departments. Send complete resumé, earnings, etc. in confidence to: Administration-Ferro Chemical, Div. of Ferro Corp., Box 349, Bedford, Ohio.

Chemist—Successful medium size Chicago area paint plant has challenging opportunity for Senior Chemist with extensive experience in the development and formulation of finishes based on vinyls in solution and as organisols, acrylics and alkyds, such as applied to metals by roller coating and strip coating processes. This firm wishes to expand into this field and offers substantial salary and many employee benefits to the thoroughly qualified individual. Replies will be kept strictly confidential. Preliminary interviews will be held in your locality. Please give outline of background and experience. P-54447, Chemical Week.

SELLING OPPORTUNITY AVAILABLE

Salesman: Industrial Chemicals; Must be thoroughly familiar with marketing heavy organic and inorganic acids; organic solvents; plasticizers and intermediates. Experienced individual can earn substantial five figure income including liberal salary, profit sharing and other benefits with progressive, rapidly expanding distributor and manufacturer. Mercury Chemical Corp., Edison, N. J., Liberty 8-1540.

Industrial Chemical Salesman-Aggressive Chemical mfgr. offers excellent growth opportunity for representative with minimum 3 yrs. field experience. Chemical or chemical engineering degree or equivalent necessary. Under 35 yrs. old and free to travel and relocate. Salary commensurate with experience. Travel expenses, company automobile, and benefit program. Send resumé to: Carlisle Chemical Works, Inc., Reading, Ohio.

Don't Forget the box number when answering advertisements. It is the only way we can identify the advertiser to whom you are writing.

POSITIONS WANTED

Sales executive or executive sales age 40. Thoroughly experienced. Industrial inorganic & organic sales to all types & size business. Prefer S.E. Excellent record. PW-5397, Chemical Week.

Top-notch, thoroughly diversified experience in laboratory and sales phases of metal finishing and industrial detergency. Prefer participation with small company. PW-5457, Chemical Week.

SELLING OPPORTUNITY WANTED

Successful Sales Organization Available For Exporters to Benelux. Here's rare opportunity for someone seeking a distribution set-up in the Benelux area! For 12 years, with great success, our firm has represented one of the largest U.S. producers of plastic materials. Only because they are setting up their own organization, we will lose one of our major products. We are seeking new plastic and chemical lines. Excellent references. Offices in Brussels and Rotterdam. Write: Imexin S.A., 5, av. de Broqueville, 15 Brussels, Belgium.

CONTRACT WORK WANTED

Poly tubes Filled 7cc to 3 Oz. cream or liquid 1,000 to 50,000 quantity. John Schirer Inc.—165 Portland Ave. Rochester, New York.

BUSINESS OPPORTUNITIES

France: Young, energetic company, having available technical staff and facilities seeks collaboration of American company to expand their chemical operation particularly in pharmaceutical products of ethical and consumer type. BO-5456, Chemical Week.

President reputable pharmaceutical chemical food plant manufacturers visiting us Oct/Mid Nov interested selling or manufacturing licences. Details urgently. Giusti c/o British Consulate General New York.

WANTED/FOR SALE

This Tracer Section can be used whenever you are looking for or offering equipment, Plants, Supplies, Chemicals, Opportunities, Special Services. The rates are low—just call or write Classified Advertising Division. Chemical Week, P.O. Box 12, N. Y. 36, N. Y., LOngacre 4-3000.

FOR SALE

Fillmaster—Semi & Fully Automatic package filling machines. $800.00 up. Stuvesant Engineering Corp. Norwood, New Jersey.

Liquidation, $8,000,000 Alcohol Plant at Omaha, Nebraska. Dryers, Filters, Stills Evaporators, Exchangers, Tanks, Pumps, etc. Send for circular. Perry, 1415 N. Sixth St., Phila. 22, Pa.

Vulcan 10'x11' dia.x 175' long rotary kiln 3/4" shell 2 tires firing hood etc. Very attractive price. Perry, 1415 N. Sixth St., Phila. 22, Pa.

T316 Stainless Steel distillation column 96" dia. x 37" high. 30 bubble cap. trays. Like new. Perry, 1415 N. Sixth St., Phila. 22, Pa.

T-316 S.S. heat exchangers 800 Sq. ft. 1/2" O.D. tubes. Perry, 1415 N. Sixth St., Phila. 22, Pa.

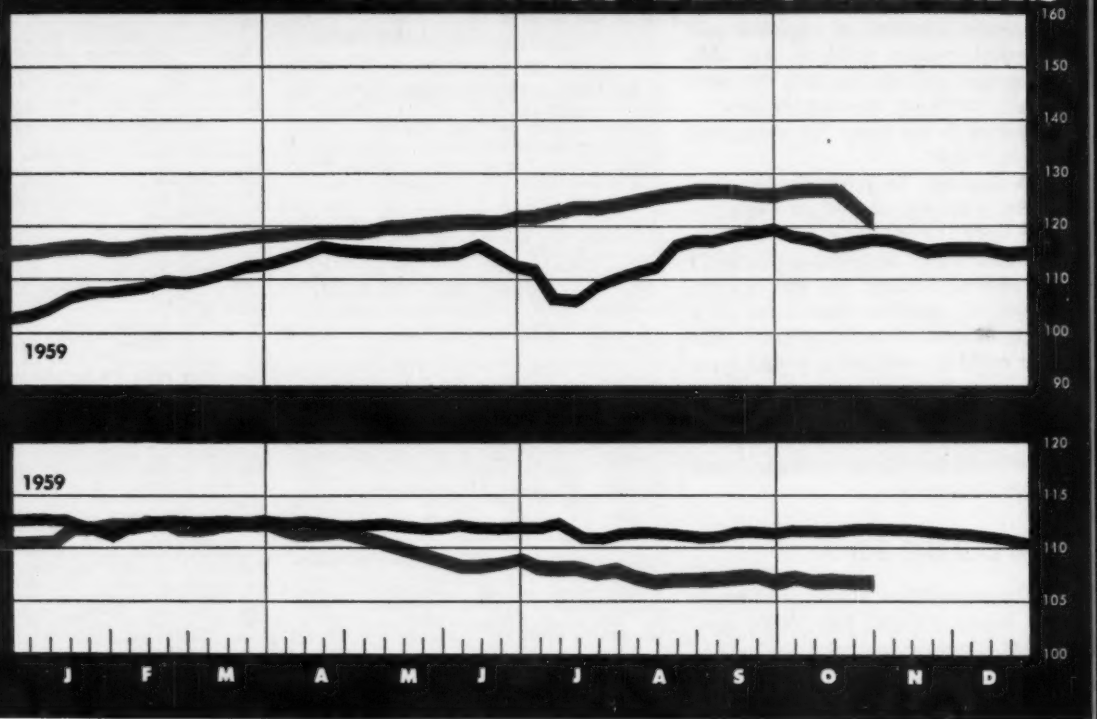
CHEMICALS WANTED

Surplus Wanted—Chemicals, Pharmaceuticals, Oils, Acids, Plasticizers, Resins, Dyes, Solvents, Pigments, Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N. Y. HAnover 2-6970.

MISCELLANEOUS

To Employers Who Advertise for Men: The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered. When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. (Others do not receive the slightest indication that their letters have even been received, much less given any consideration.) These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide. We can guarantee that Every Advertisement Printed Is Duly Authorized. Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes. We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements. Classified Advertising Division, McGraw-Hill Publishing Company. "Put Yourself in the Place of the Other Fellow."

BUSINESS BENCHMARKS

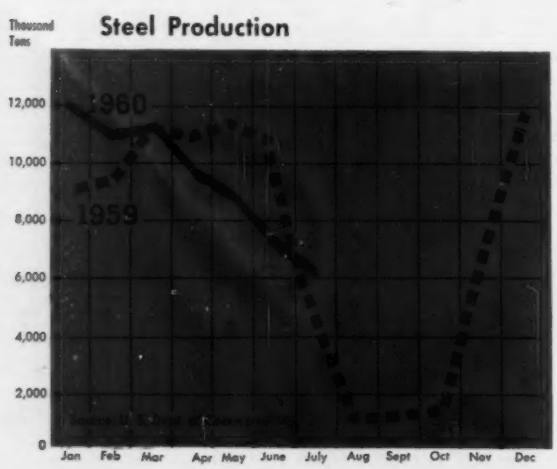


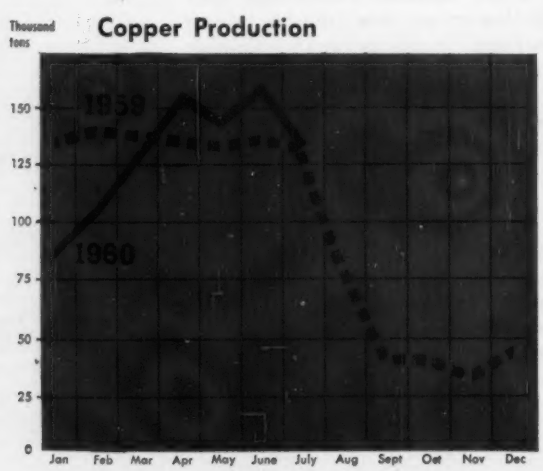
OCTOBER 15, 1960

WEEKLY BUSINESS INDICATORS	*Latest Week*	*Preceding Week*	*Year Ago*
Chemical Week output index (1957=100)	119.4	122.1	118.9
Chemical Week wholesale price index (1947=100)	106.5	106.5	110.9
Stock price index (12 firms, Standard & Poor's)	44.82	44.43	57.12
Steel ingot output (thousand tons)	1,500	1,558	362
Electric power (million kilowatt-hours)	13,779	14,156	13,234
Crude oil and condensate (daily av., thousand bbls.)	6849	6877	6812

WHOLESALE PRICE INDICATORS (1947-49=100)	*Latest Month*	*Preceding Month*	*Year Ago*
All commodities (other than farm and foods)	128.2	128.2	128.4
Chemicals and allied products	110.5	110.4	109.7
Industrial chemicals	124.6	124.7	123.7
Paint and paint materials	119.9	119.4	118.5
Drugs, pharmaceuticals and cosmetics	95.4	95.1	93.6
Fats and oils (inedible)	48.9	47.8	53.8
Fertilizer and materials	108.4	110.6	104.8

CHEMICAL CUSTOMERS CLOSE-UP





Metal Fluorides

by B&A

from

Aluminum fluoride

Antimony pentafluoride

Barium fluoride

Cadmium fluoride

Calcium fluoride

Chromium trifluoride

Cupric fluoride

Lead fluoride

Magnesium fluoride

Molybdenum hexafluoride

Nickelous fluoride

Silicon tetrafluoride

Stannous fluoride

Strontium fluoride

Titanium tetrafluoride

Tungsten hexafluoride

to

Zirconium tetrafluoride

General Chemical offers 17 B&A® metal fluorides for your research or process needs.

For metal fluorides—as for most other fluorine chemicals—your best source is General Chemical. Here's why:

General's extensive fluorine program is geared to produce virtually *every* fluorine compound required by industry. The Company's basic position in hydrofluoric acid . . . its manufacturing ability and versatility . . . its long experience in producing specialized Baker & Adamson fine and custom chemicals . . . and its advanced fluorochemical research program—all combine to make General Chemical your prime source for metal fluorides.

For samples, prices and technical data on any of the metal fluorides listed here—or information about any other fluorine chemicals you may be interested in—write us today on your company letterhead.

BAKER & ADAMSON®
Fine Chemicals

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

HERE'S ONE THAT WORKS ...

every time—and for a long time

You'll never break your back trying to turn this valve. The plug seals securely in a Teflon® sleeve. It won't stick or freeze—even after months in one position. It's priced to replace ball valves, gate valves and lubricated plug valves wherever they are in use.

Available in ¼" through 6", 150 and 300 psi, straightway and 3 way. Alloys include carbon steel, 316 S.S., Durimet-20, Monel, Nickel, Chlorimet-2 and Chlorimet-3.

Write for your copy of Bulletin V/14.

DURCO

Serves the Process Industries

THE DURIRON COMPANY, INC., Dayton, Ohio / Valves • Pumps • Filters • Process Equipment